

# Chemical Week

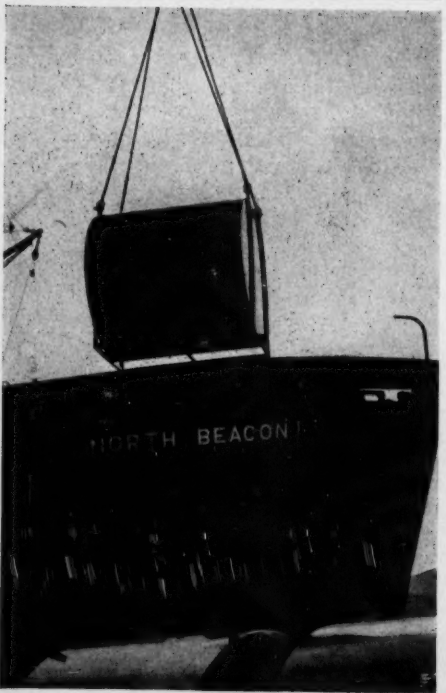
May 30, 1953

Price 35 cents



- Industry bids for public understanding; exec panels handle hot questions . . . . . p. 13

Even prideful Texans are agape at Orange, Texas' giant chemical strides . . . . . p. 18



- Drums too small? Tank cars too big? Take a look at novel, in-between containers . . . . . p. 28

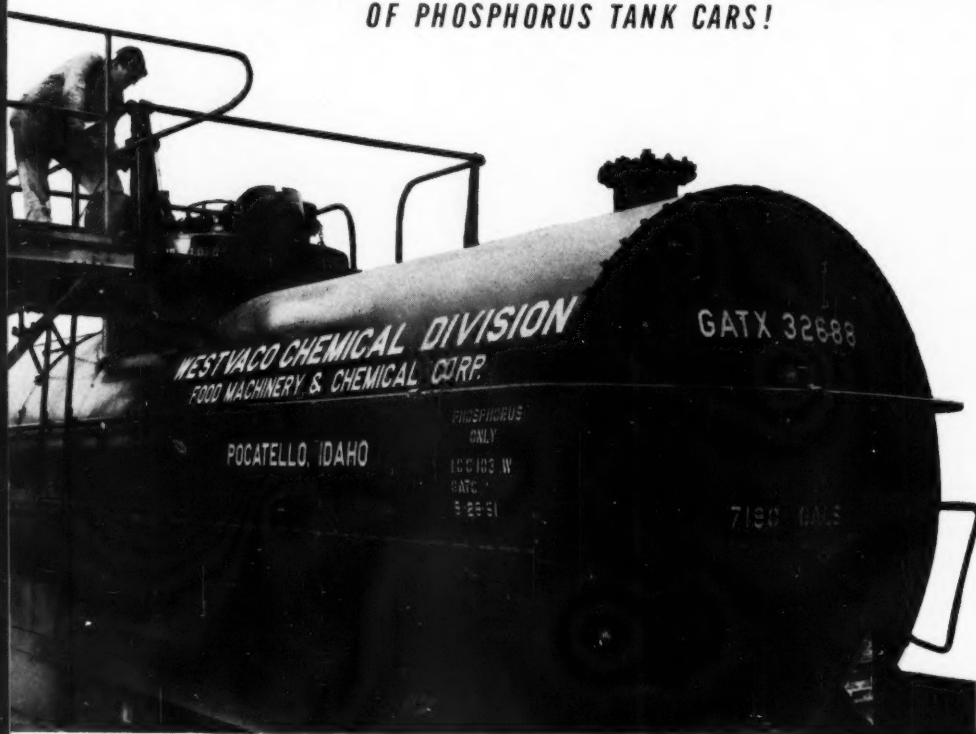
Chemical makers harness ultra-violet light to give tough syntheses one-two punch . . . . p. 40

Nonionics gobble larger slice of detergents pie; prime mover: unexpected new uses . . . . p. 52

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# Chemical Week

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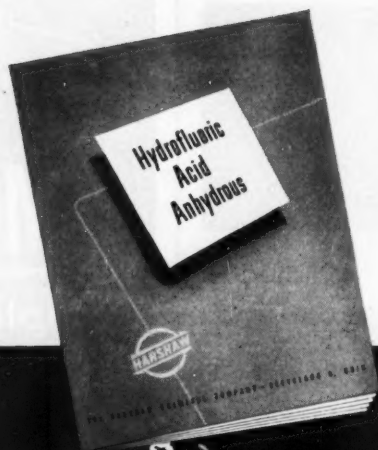
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## OPINION...

### More Harm than Good

TO THE EDITOR: . . . I am completely disgusted by some of the antics of the chemical people who are fighting to keep tariffs from being changed . . . and I think that, although there are many chemicals that are entitled to protection, the tricks of these high-tariff boys are going to do us all a lot of harm . . .

What I loath is the arithmetical clowns . . . or perhaps we should call them the sleight-of-hand statisticians . . . They drag out figures to "prove" that U.S. tariffs have been slashed to ribbons in the past few years . . . We have reduced duties, again and again. It's all prettied up and "proved" with percentages . . . What they do quite often is to take average tariffs on *all* U.S. imports in some year (1939 is a favorite) and compare it with average tariff on *all* imports in 1951. No one is supposed to have even a flickering thought that possibly the character of our imports has changed . . . that we may now be bringing in a lot of materials desperately needed for defense—completely duty free. It is the old trick of comparing oranges and bananas . . . it is the same sort of intelligence-insulting nonsense we see in cigarette ads . . . trumped "facts" and incomparable comparisons . . .

Perhaps these purveyors of the phony figures are managing to fool some people . . . perhaps even themselves. But anyone with three quarters of a wit can detect those transparencies . . . and those who do will believe nothing—no matter how true—we say about ourselves and our industry . . .

R. C. MEYER  
San Francisco, Calif.

### Against State Control

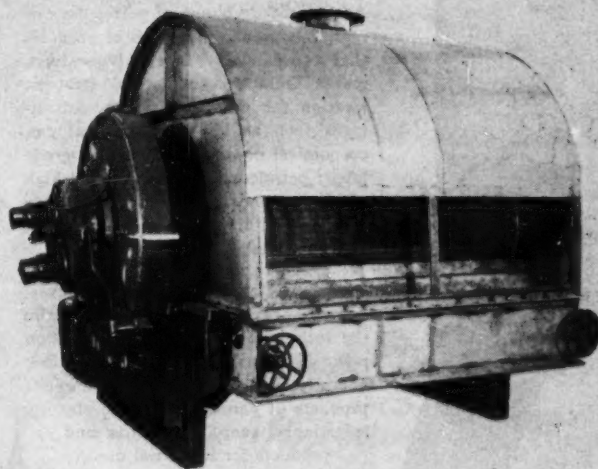
TO THE EDITOR: Congratulation on your editorial on Secretary Weeks and Dr. Astin. We all deplore any interference of government in science, but the same issue is at stake from another angle as pointed out by Sinclair Weeks . . . this must not be overlooked in the battle for intellectual freedom.

This issue is the ever-increasing

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

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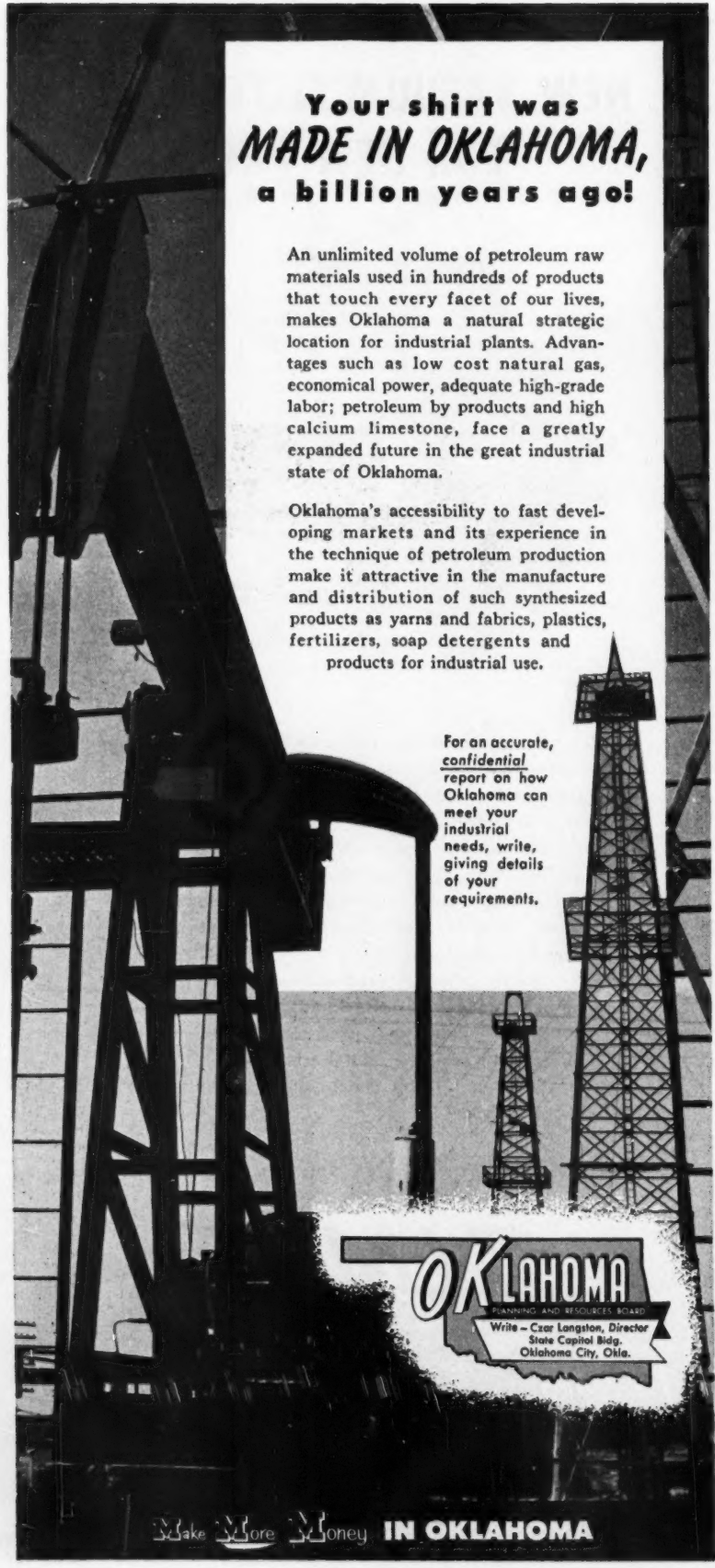
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## OPINION . . . . .

idea that it is the duty of the State to pass on the value of new products and ideas through the recommendations of these experts we all respect. With all due respect to scientific authority the writer wishes to point out that history has shown us many examples when said authority, with all the knowledge and expert opinion, was later proved wrong.

Secretary Weeks believes, as do I, that new innovations, provided they are harmless, should be tested by the critical public in open competition . . . and not arbitrarily in government laboratories. Few would hesitate to state that open competition is a far more difficult hurdle and critique of ultimate value, especially if one has had any experience in marketing a new product.

May the writer point out that small business gets started *not* in competition with the *same product* as large business, but rather with innovations that have consumer utility and that are either too risky, involve simplicity beyond the reach of complex big organizations, or return a gross business profit too small to interest big corporations. If every such innovation had to be subjected to the opinion of experts over its economic value to the public, you and I both know small business would disappear overnight.

WILLIAM A. HANSON  
Hanson Research Co.  
Van Nuys, California

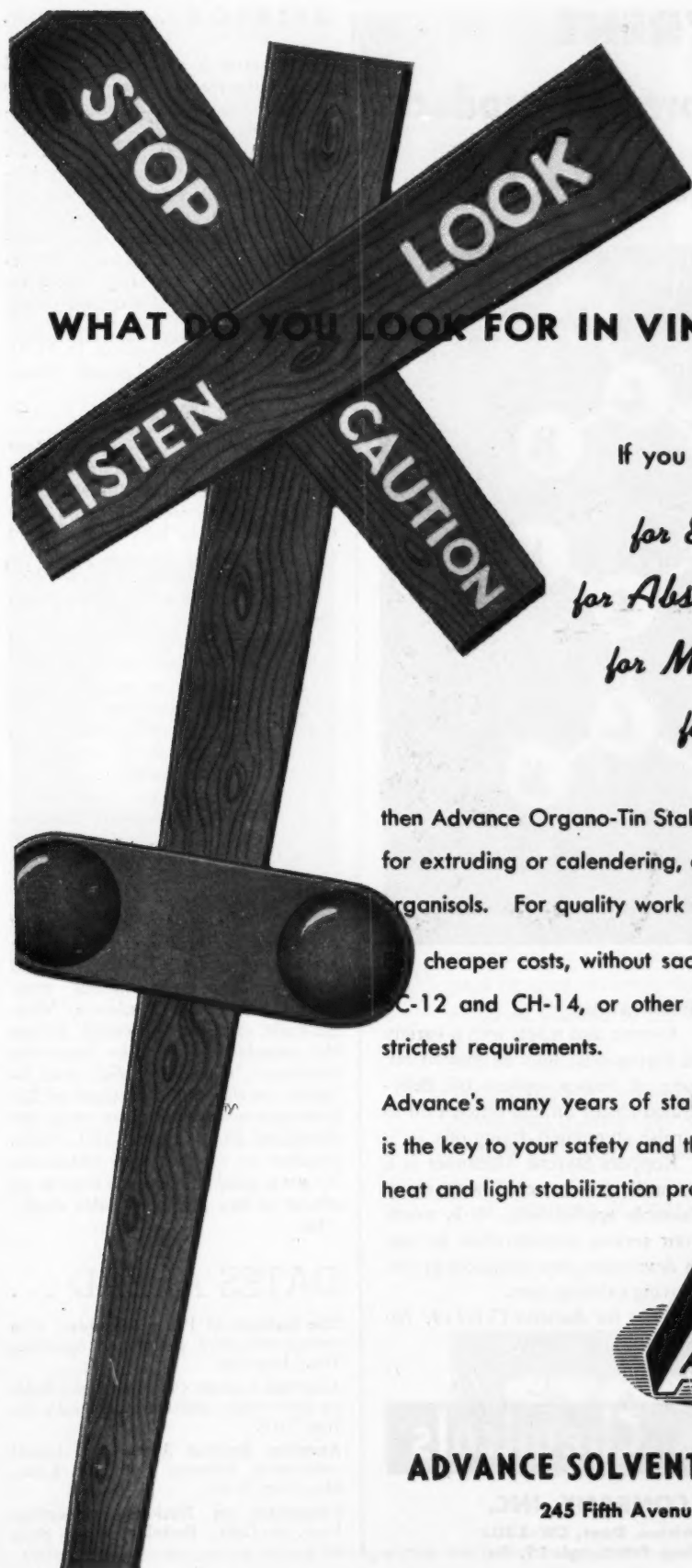
## Add it to Salt?

TO THE EDITOR: . . . I have read some of the letters . . . on fluoridation (*Mar. 7, et seq.*) and the opinion expressed that the [public] resistance to fluoridation is similar to that encountered when chlorination was first proposed. . . . There is absolutely no comparison between chlorination and fluoridation . . .

There is a direct similarity in the attempt a number of years ago of the public health men to reduce incidence of goiter by adding iodides to public water supplies . . . The water departments of cities were able to stop this monstrous idea . . . the government allowed private enterprise to produce iodized salt . . .

You know, of course, that Leslie Salt Co. has U. S. rights to European patents . . . to produce fluoridized salt. It is willing to share rights with all other salt companies . . . Obviously, via fluoridized salt, country as well as city kids can have this alleged benefit at practically no cost . . .

You may not know that the dental profession has never been allowed to discuss this question [fluoridation] be-



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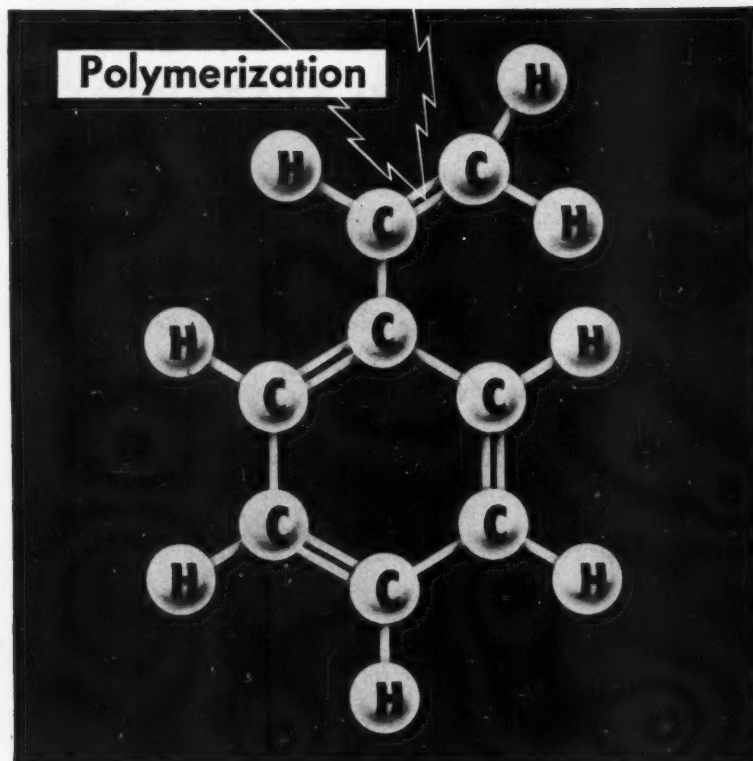
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## OPINION . . . . .

fore or after it was quickly slipped through the many societies. The same goes for the medical profession . . .

Now, with the Public Health Service . . . by careful planning . . . [spending] great sums of money provided by the American taxpayer, and with the sister bureau, Food and Drug, blocking the marketing of fluoridized salt . . . it looks as if it is going to take more than the election last fall to stop empire-building bureaucrats . . .

ARTHUR B. MACWHINNIE, D. M. D.  
Seattle, Wash.

## All's Well in West

TO THE EDITOR: . . . Two of our larger chemical manufacturers have called to my attention the statement in your Apr. 18 issue: "On the West Coast, executives have found plant sites much harder to come by in the San Francisco vicinity. General difficulty seems to be a lack of necessary acreage."

. . . Since the end of World War II the chemical industry alone has spent over \$108 million on manufacturing facilities in the San Francisco Bay Region. This trend still continues . . . we have yet to hear of anyone encountering site difficulties. . . .

CHARLES A. ANDERSON  
Assistant Manager  
Industrial Dept.  
Chamber of Commerce  
San Francisco, Calif.

*It is misleading, we think, to lift that statement out of context. All things are relative and CW simply reported what executives in various areas (Texas, Oklahoma, Louisiana, Niagara Falls, etc.) have observed. Among the unpublished remarks from San Francisco: "It's hard to find good locations on the peninsula south of San Francisco with both open areas for expansion and trackage. The area is building up too fast with residences. To get a good location you have to go almost to San Jose" (47 miles south). —Ed.*

## DATES AHEAD . . .

The Institute of Paper Chemistry, 17th annual executives' conference, Appleton, Wis., June 4-5.

American Leather Chemists Assn., Golden anniversary meeting, Cincinnati, O., June 7-10.

American Soybean Assn., 33rd annual convention, Jefferson Hotel, St. Louis, Mo., Aug. 20-21.

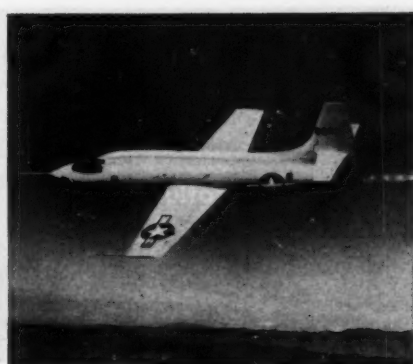
Conference on Nuclear Engineering, Univ. of Calif., Berkeley, Calif., Sept. 9-11.



The Sante Fe's "Chief" and "Super Chief" operate under conditions of high speed and excessive heat. Electric motors develop such heat that ordinary insulation would swell or burst and cause the rotors to "freeze" in the mounting. By impregnating these rotors with protective resins under high vacuum in Stokes Impregnators, each turn of wire is held rigidly in place and the motors operate without interruption. Vacuum impregnation also helps in making lace and rugs, metal castings and electrical parts, abrasive wheels and oil-less bearings, water-proofed paper and cloth, and many other common products. Send for descriptive and illustrated brochure on "Vacuum Impregnation."



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Why is the sailor so happy? A grievous injury to his leg, which until recently, would have demanded amputation, was repaired with human bone preserved by freeze-drying under vacuum. After physical and medical therapy the sailor will walk normally again. The process of preserving human bone in this way for storage in the tissue bank is carried out in Stokes Freeze-Drying equipment. The new technique was developed by staff officers at the U. S. Naval Medical Center, Bethesda, Maryland, in collaboration with members of the Stokes organization. Freeze-drying in vacuum is also essential to the preservation of blood plasma and some biologicals, and to the preparation of many of today's "wonder drugs," including ACTH and cortisone. Send for an informative booklet on "Vacuum Freeze-Drying."

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carbonate of potash

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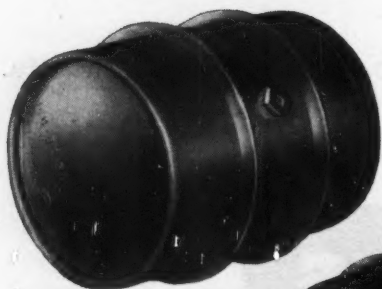
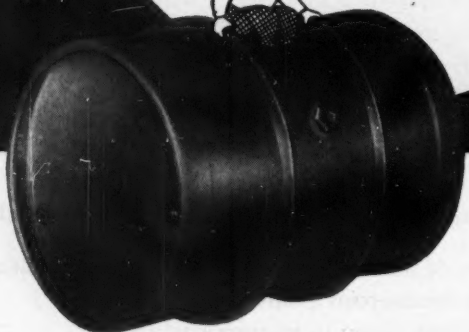
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CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

Chemical Week • May 30, 1953



## NEWSLETTER

A second branching out within a month is the new products news from Archer-Daniels-Midland. Only a few weeks ago (CW, May 2) the firm unveiled its new fat-derived plasticizers, and now it will build a plant at Ashtabula, O., to produce its new unsaturated higher alcohols.

Ground will be broken next month; facilities will be operating a year later, turning out not only the new unsaturated products but also its older line of saturated alcohols—cetyl, stearyl and sperm oil alcohol—as well. Animal, vegetable and marine oils will be utilized; caustic soda and glycerine will be by-products.

Chief reason for the location: nearness to National Distillers' sodium—a reagent in the reduction process.

Ashtabula, too, has removed a roadblock from the path of plastic automobile bodies. A zoning hassle has held up Lunn Laminates, Inc., which proposes to manufacture polyester-glass fiber vehicle body parts. Its site has now been zoned for manufacturing so that it can proceed to exploit this new field that resin makers are watching hopefully.

The big polyester push is behind Commercial Solvents' expansion at Agnew, Calif. It already produces pentaerythritol there, but is readying additional capacity. It will be onstream early next year.

New animal-oil uses like Archer-Daniels-Midland's aren't enough to satisfy the National Renderers Assn. Worried by the surfeit of tallow and greases now that nonfat-based detergents are supplanting soap to a considerable extent, the association is contracting with the U. S. Dept. of Agriculture's Eastern Regional Research Laboratory (Philadelphia), Stanford Research Institute (Palo Alto) and the American Meat Institute Foundation (Chicago) to develop new uses for these overabundant materials. Some ideas: addition to animal feeds to control dust and stabilize vitamins, addition to fertilizers to stimulate plant growth.

Also concocted by the association is a slogan designed to bolster their chief market: "Real Soap Costs Less, Cleans Best."

Procaine penicillin is Eli Lilly's and no one else's. That's the import of a decision handed down by Judge William Steckler in the Indianapolis Federal District Court. Lilly brought suit against Schenley Laboratories in April '51, alleging infringement of Lilly's patent on procaine penicillin (which Lilly calls Duracillin). Schenley is now enjoined from making, using or selling the product in any form. Other defendants in similar Lilly proceedings: Heyden and J. T. Baker. All other makers of procaine penicillin operate under Lilly licenses.

California's pesticide control law has been extended until 1957. It requires a permit from the county agricultural commissioner to use pesticides injurious to people. A feature of the new law, replacing the old one slated to expire this September: supervision by the commissioner in place of a permit; review of a commissioner's actions in such cases by the state director of agriculture.

The Sabine River, usually a blessing to Orange, Tex. (see p. 18) can also be a bane. Average daily flow of the river is close to 6 billion gal.; but it seasonally tapers off to 0.2 billion, builds up to 56 billion. Last week's floods exceeded all previous history, and only fast and furious sandbagging saved the area's chemical plants from damage. Lake Charles, La., on the Calcasieu River, fared worse, battled hip-deep water—but levees and sandbags kept the swirling flood away from refineries and chemical plants.

This catastrophe should put steam behind the Sabine River Authority. That's a two-state compact between Texas and Louisiana, which are bounded by the river for 265 miles. The Texas legislature has already ratified the agreement, and the Louisiana legislature will act next year. What it will do: apportion water to the two states; encourage proper use of the river; and—perhaps most important—construct a series of dams and reservoirs to lop off the peaks, fill in the valleys of the river's flow.

First project, once Louisiana gives the go-ahead: a dam at Toledo Bend to impound up to 30 million gal. Several smaller dams will eventually be built farther up the river.

But gas as well as water occupies Texan's attention this week. Attorneys for the three companies testing the validity of the state's natural gas gathering tax again asked the supreme court to review the appeals court's decision upholding the tax.

The lawyers' brief was indeed so brief that it was more of a formality than argument; it appears as if the attorneys were simply observing legal protocol before appealing to the U.S. Supreme Court.

Don't cover your warning labels with a wrap-around advertisement. That's the moral of a recent Food and Drug Administration action. It seized a shipment of a lye-containing drain cleaner because the label, which complied with the law by calling attention to the caustic poison and listing antidotes, was covered by a wrap-around advertising band glued to the container.

In another instance last week chemical makers beat FDA to the draw. Four manufacturers of coumarin—Dow, Du Pont, Monsanto and Trubek—voluntarily withdrew the flavoring agent from sale for food uses.

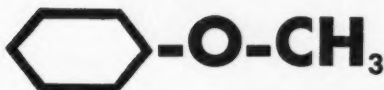
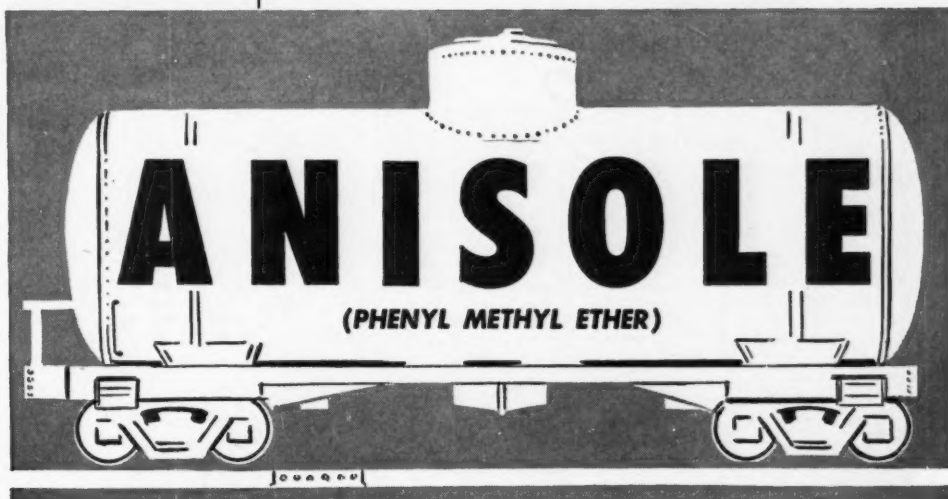
Although no human illness has been traced to coumarin, independent pharmacological research by both FDA and industry raised some doubts as to its safety. The makers were the first to take action, approached FDA with a voluntary and official withdrawal of the product.

FDA was frankly surprised—but pleasantly, since its role is usually to force withdrawal. The agency commended the manufacturers for their action in the public interest. It is continuing its research, and whether coumarin is subsequently returned to the market depends largely on the outcome of its studies.

Here's a new twist on applying insecticides: the U.S. Dept. of Agriculture has controlled pests by soaking flower bulbs in an insecticide solution before planting. Narcissus bulbs soaked for 10 minutes in various insecticides were protected against the narcissus bulb fly, major insect pest of this spring flower. Heptachlor seemed to work the best, but aldrin and chlordane were also effective. Best dosages are now being determined. In recent tests two-thirds of an ounce of 25 percent heptachlor in 5 gal. of water gave complete protection.

... The Editors

# Now from Du Pont in tank car lots—



## IMPORTANT PROPERTIES OF

## ANISOLE

Appearance.....	a light straw-colored liquid
Molecular Weight.....	108.13
Specific Gravity 18°/4°C.....	0.996
Melting Point.....	-37.3°C.
Boiling Point, 760 mm.....	153.8°C.
Specific Heat, 24°C.....	0.422
Viscosity, 20°C.....	1.086 cp
Refractive Index, 20°C.....	1.5165
Water miscibility	
(a) Anisole in water, 30°C.....	0.01
(b) Water in Anisole, 30°C.....	0.22
Heat Stability.....	after 2 weeks at 250°C. in presence of air: no permanent gases formed, low boilers below 0.04%, high boilers below 0.02%
Water Azeotrope.....	boiling point 95.5°C., 59.5 Wt.% Anisole



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Chlorosulfonic Acid	Aluminum Chloride
C. P. Reagents	Aluminum Sulphate (I. F.)
Formic Acid	Sodium Metasilicate
Lactic Acid	Sodium Silicate
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## Put this high boiling ether to work for you!

**AS AN INTERMEDIATE**—Anisole is a reactive intermediate. It is readily alkylated or acylated under mild conditions, and undergoes Friedel Crafts reactions with a wide range of compounds. Halogenations and nitrations are similar to those of phenol. The wide range of Anisole derivatives finds use in such fields as pharmaceuticals, perfumes, plastics and dyestuffs; and includes, to mention a few examples, anethole, p-anisidine, anisaldehyde, p-methoxy benzene sulfonamide, p-methoxy acetophenone, and anisic acid.

**AS A SOLVENT**—A stable high boiling ether, Anisole is ideally suited as a reaction medium and recrystallization solvent. Its value in such applications is enhanced by its resistance to peroxide formation and Grignard reagents, and its action as a mildly catalytic solvent for acid forming reactions, where it acts as a Lewis base. Water immiscible, Anisole is completely miscible with most organic solvents and is itself an effective solvent for a wide range of organic materials.

**AS A HEAT TRANSFER MEDIUM**—Anisole has found use as a special heat transfer medium for temperatures in the 150 to 260°C. range due to its outstanding high temperature stability, water immiscibility, high boiling point, and high flash point. Its wide liquid range, low viscosity and comparatively high density suggest its utility as a liquid medium at lower temperatures.

### Mail this coupon for further information

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Grasselli Chemicals Department, Wilmington 98, Del.

Please send me more information on Anisole: advantages, properties, applications. I am interested in using Anisole for \_\_\_\_\_

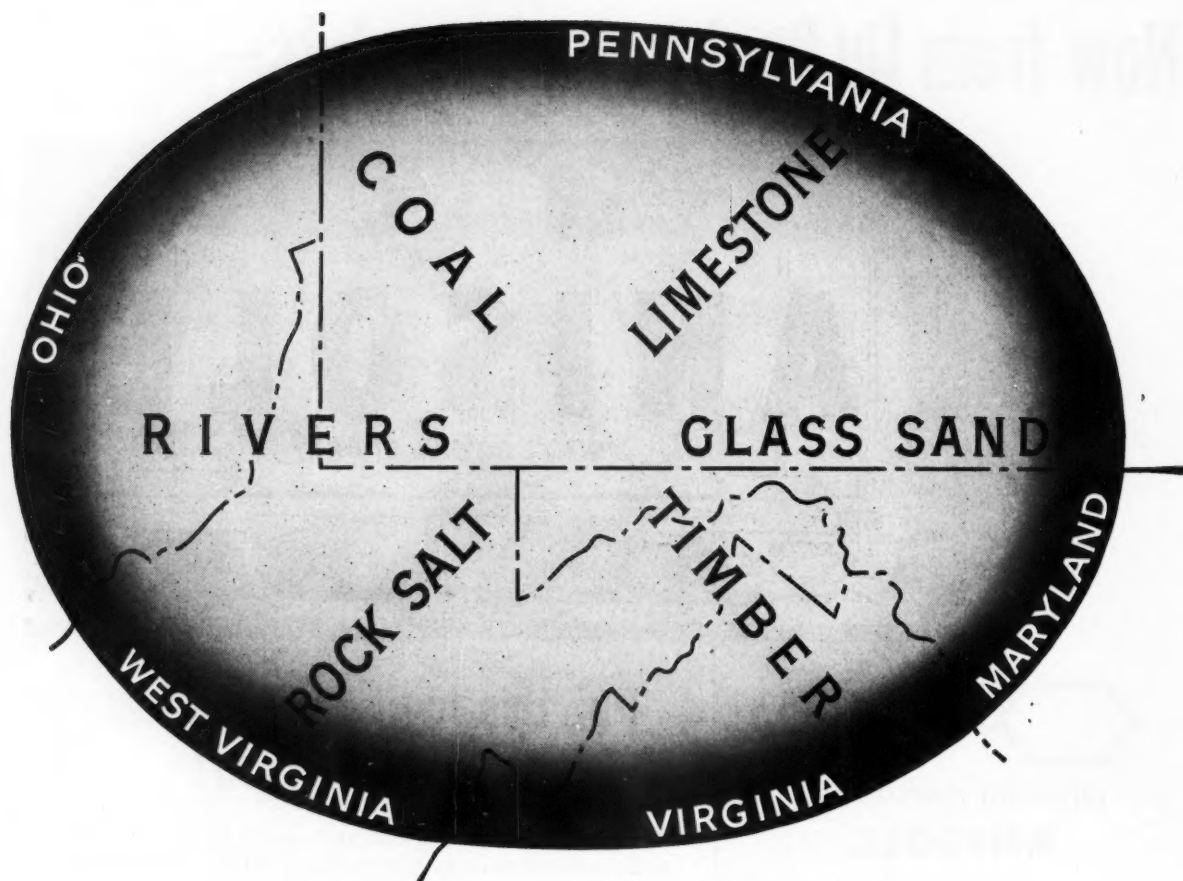
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resources*

Where can you find an area more abundantly blessed by Nature than West Penn Electric's 29,000 square miles of territory? It has large deposits of bituminous coal—for metallurgical, chemical, fuel and other uses—and substantial reserves of all types of commercial limestone. There too are rock salt and brines, high-quality glass sand, petroleum, natural gas, ceramic and fire clays, and timber.

The area's salt deposits and high calcium limestone, *with bituminous coal*, offer an ideal combination for manufacturers of basic organic chemicals. Its rivers and streams supply ample water for processing and cooling.

Along with these natural resources, there are technical research facilities and enough manpower to supply both established industries and new ventures. During the past few years, manufacturers of a wide variety of goods have built plants in West Penn Electric's territory and found there the environment needed to develop and serve broader markets.

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Area Development  
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It provides a simple  
way of defining your  
needs. Our staff  
will recommend and  
describe industrial  
locations to fit.



***West Penn Electric System***

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## BUSINESS &amp; INDUSTRY . . .



EDUCATOR AUDIENCE, INDUSTRY PANEL: They each taught the other, they both learned a lot.

## Uphill to Understanding

"I can't believe that!" said Alice.

"Can't you?" the Queen said in a pitying tone. "Try again: draw a long breath, and shut your eyes."

Alice laughed. "There's no use trying," she said: "one can't believe impossible things."

"I daresay you haven't had much practice," said the Queen. "When I was your age, I always did it for half-an-hour a day. Why, sometimes I've believed as many as six impossible things before breakfast. . . ."—LEWIS CARROLL.

The 622 social science teachers, text book writers, and other opinion molders at hilltopping Rensselaer Polytechnic Institute last fortnight weren't asked to believe any impossible things before breakfast, but thereafter for two whole days they were crammed with imagination-challenging facts about the chemical industry.

They had been 'planed and trained in—all expenses paid to the tune of \$110,000—from Bemidji, Minn., and Corpus Christi, Texas; from Bellingham, Wash., and Miami, Fla.; from small towns and cities throughout the nation.\* Their host: the Industrial

Council, a forum originated and ably directed by RPI and underwritten by good-citizen corporations to give the public a clearer understanding of industry and its leaders.

Last year the oil industry had its innings; next fall the electrical industry will have its day in court; but this time, 178 top-rung chemical executives were on hand both to expound and to be queried on the role of chemical makers in our society.

**Give and Take:** The efficiently managed confab featured a happy blend of give and take, of hearing and being heard. At mealtimes, articulate spokesmen like Du Pont's Bill Ward, Dow's Lee Doan, A. D. Little's Earl Stevenson, Kopper's Brehon Somervell delineated industry's role—characteristics, development, future, national security aspects; but mornings and afternoons the tables were turned: then the educators peppered industrialist panels with searching, sometimes perplexing, questions.

More than once ugly misconceptions juttied out above the placid surface of propriety, revealed the widespread fears and fables that pass as truth in the public mind.

One by one, panel by panel, all

these were trotted out:

- Do industrialists incite war? Educators looked at industry's fat war contracts, discerned a profit-coveting motive. ("That's ridiculous. War shrinks, impedes development of larger, more lucrative, normal markets. Even if we had no humane spark, heavy taxation eliminates any profit possibility.")

- Do chemical companies repress new developments by "burying" patents? ("That's a bewhiskered myth. If we wanted to, we couldn't—our competitors are all too bright.")

- How about cartels? ("The Justice Department has a sensitive nose, carries a mighty big stick.")

- Chemicals stink—you darken our air, befoul our rivers. ("Even in the absence of law, chemical companies have spent millions on pollution control. Besides, ordinary sewage is the main culprit; chemical companies have helped municipalities to lick sewage problems. Nonetheless, our plants get blamed for all the stinks that do arise.")

- Do chemicals poison our food? ("Think we want to kill off our customers?")

- Why do you make these fantastic advertising claims? ("We don't. We are basically suppliers of raw materials and we can't control all our cus-

\* Selected on a proportional basis by states: New York, 146; California, 13; Oregon, 5; etc.

tomers. That's the Federal Trade Commission's job.")

**Challenge to Industry:** But all was not inquisition. The teachers also came up with these ideas:

- "Make more of your men available to us as classroom speakers and career counsellors."

- "We appreciate the help corporations give to college and postgraduate students; but you could also reap dividends by doing the same for deserving secondary school students."

- "You can't convince people there is no pollution by just insisting it doesn't exist. Do what you can; tell people what you are doing; work with, not against, local authorities."

This, too, was evident: delegates from communities in which enlightened companies operate (e.g., Dayton, O.) had a clear conception of industry, its problems and objectives. Significantly, several mentioned that they were small stockholders in chemical enterprises and this gave them a warm feeling toward the companies, made them conscious of the staggering tax load they bear. ("Dividends were \$8 million; taxes \$12 million.")

The educators came to learn, and they carried away copious notes. More important, they left behind some preconceived notions and distorted half-truths, carried away a clearer, rounder impression of the industry and of businessmen. ("Chemical executives are smart. They drive to the heart of the question—fast; they don't try to duck the tough ones.")

**Job to be Done:** But it was clear to the businessmen that the curriculum was too tough to master in two days.

One executive summed up what may have been the consensus, when, while waiting for his midnight plane, he said:

"I didn't expect them to know too much about our industry, but I was shocked to find out how little they actually do know about us and just what they do believe. We, in my company, have just been paying lip service to public relations—and I guess our industry has been laggard as well. I'm glad the Manufacturing Chemists Assn.\* is beginning to do something about it. It's an uphill battle to win understanding, but it sure needs to be done."

Perhaps, by means of the Industrial Council and similar industry-public rapprochements, teachers and their pupils, like Alice, may yet believe six impossible, but incredibly true, things about the chemical industry—even before breakfast.

\* Which gave a copy of its new Facts Book (see p. 16) to each registrant.



**GAF TRIUMVIRATE:**\* For firm's return to private ownership, more eagerness in face of same obstacles.

## Continuity Compromise

The road leading to private ownership for government-held General Aniline & Film Corp. looks as long and as rocky as it did when the Democrats were in power, but the new Republican appointees promise to try to speed up the journey along that route. At last week's annual meeting, Col. Dallas S. Townsend, new Office of Alien Property director, introduced Winston Paul as Attorney-General Herbert Brownell's choice for chairman of the board of both GAF and its sales outlet, General Dyestuffs Corp. Townsend said Paul, who will serve without compensation, will bring about "improved coordination" between GAF and OAP, and will "assist the Department of Justice in the return of GAF and GDC to private American ownership."

Jack Frye, who has been serving as both chairman and president, will continue in the latter post. He'll be chief executive officer and chairman of the executive committees for both companies. Other officers were re-elected.

**Officers Join Board:** The new lineup appears to be a compromise between Congressional criticism calling for new leadership and some minority stockholders' plea for "continuity of control." Brownell, whose agency holds 98% of GAF voting stock, retained Frye and five other holdovers on the board of directors, installed nine new members, including Paul.

\* Left to right: Winston Paul, new board chairman; Col. Dallas S. Townsend of OAP; and Jack Frye, holdover president.

Among other new directors: John C. Franklin, executive vice-president of both GAF and GDC; James Forrestal, vice-president in charge of Anso and Ozalid divisions; and Francis A. Gibbons, who also was named to the newly created office of vice-president, finance. (Reporting to Gibbons will be two other GAF veterans, A. E. Hendershot as the new treasurer and W. A. Hensel as controller.)

Paul is president of Domestic Exploration Corp., a privately owned investing company. His business background includes the New York and New Jersey distributorship for Frigidaire, 1922-1930; and about four years as chairman of Huyler's, Inc., a chain of restaurants and candy shops. As a civic leader in New Jersey, Paul served as chairman of the Committee for Constitutional Revision that succeeded in winning adoption of that state's new constitution in 1948.

**Blair Gets Option:** Meanwhile, it was learned that Interhandel AG, the Swiss firm that owns the GAF stock seized by the U.S. government in World War II, has granted to Blair Holdings Corp. of New York an option to buy those blocked shares for \$60 million if and when the stock is released by OAP (CW Newsletter, Apr. 11).

Interhandel has brought suit in Washington for return of the stock, but the Swiss government has prevented Interhandel from showing the court certain papers relating to ownership of the firm. The court has ruled



that Interhandel's suit will be dismissed if those "Sturzenegger documents" aren't produced by June 15. In any case, if OAP gets to sell the contested stock, Interhandel or its stockholders (if they're classed as "non-enemy") will be entitled to indemnity for loss of their share of GAF. It's a puzzle for a lawyer's lawyer.

## Call for Action

The National Manpower Council has reported to President Eisenhower that the U.S. is missing the boat, is weakening national security by its failure to provide proper education and training for a "vast reservoir of highly intelligent young people."

Decrying the wastage of American brainpower, the council revealed that less than half of those capable of acquiring a college degree enter college, that two-fifths of those who do start never graduate.

Warning that "scientists and professional people, unlike commodities, can not be stockpiled against future shortage," the Council delved into the problems of providing sufficient engineers, physicists, teachers, doctors. Some of its findings:

- Since 1900, scientists have been multiplying twice as fast as the nation has grown, but today's force amounts to only 0.2% of our total population.

- Numerically, there is now a shortage of 25,000 engineers.

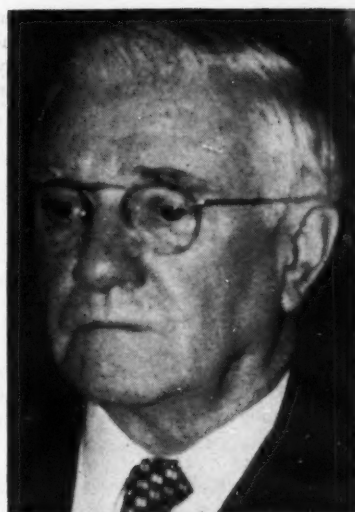
- The emergency in Korea, added to the high peak of employment, has imposed a serious manpower squeeze.

NMC suggests two broad courses of action—either to alter distribution of available talent to "anticipated shortage areas," or to encourage the expansion of the whole college population. The former has the advantage of producing quick results, the drawback of expanding some fields at the expense of others. The latter would expand the source of supply, would help to reduce loss caused by the failure to train many able people.

Among its other recommendations: establishment of a Presidential commission to find out how badly the \$2-billion government research and development programs may be crippling colleges by diverting them from their primary responsibilities of teaching and basic research.

## Limits for Lookers

Whether there should be explicit "ground rules" governing the fact-seeking efforts of Food & Drug Administration inspectors is in dispute as a Congressional committee works on a bill that would give FDA agents the right to enter and examine food and drug factories without the owners' permission.



NEW JERSEY'S WOLVERTON: On FDA bill, he wants action pronto.

As Rep. Charles A. Wolverton (R., N.J.) closed last week's two-day hearing on this question, it appeared that there's a cleavage in his Interstate & Foreign Commerce Committee that may show up again when his plant inspection bill gets to the full House.

Wolverton hopes to push his bill through committee quickly and get it to the floor without amendments on detailed regulations on inspections. But some committee members, unwilling to give FDA and the trade a blank check to put together an inspection code not based on law, want to spell out inspection limitations in the bill.

Among the 20 witnesses at the hearing were FDA Commissioner Charles W. Crawford and Ira D. Cardiff, an apple processor from Yakima, Wash. Cardiff, whose defiance of FDA inspectors led to the Supreme Court decision that crumbled the present inspection law as ambiguous, called himself "the villain in this farce." A still grosser farce, with even more litigation, is what both FDA and industry spokesmen told the committee would result from putting too many inspection stipulations in the new bill.

## EXPANSION. . . .

**Aluminum Fluoride:** General Chemical Div., Allied Chem. and Dye Corp., has put its aluminum fluoride plant, Bay Point Works, Nichols, Calif., into operation. Plant output: 15,000 tons/year, slated exclusively for Kaiser Aluminum and Chemical Corp., Oakland.

**Acrylonitrile:** B. F. Goodrich Chem-

## Higher Education of Persons with College Ability 1951-52

Ph.D's and M.D.'s (2%)



College Graduates (37%)



College Entrants (49%)



Total with College Ability (100%)

(1,400,000 Persons: 18 through 21)

AT A GLANCE: A reservoir of wasted talent.

ical Co. plans to build a \$8.5-million plant at Calvert City, Ky., to manufacture acrylonitrile. Annual capacity will exceed 24 million lbs.; operation is scheduled by the fall of 1954. (CW, Newsletter, May 23).

First full-scale commercial producer of acrylonitrile in the U.S., American Cyanamid, now turns out 30 million lbs./year, has facilities under construction for an additional 50 million lbs. Further: Union Carbide now has a capacity of 24 million lbs.; Monsanto can make in excess of 50 million lbs.

The expansion statement follows closely Goodrich's formal opening of a \$6-million vinyl chloride plant in Calvert City (CW, Apr. 18).

**Manganese:** The Hoppewood Manganese Co., Clay, Ky., expects to get its manganese ore dressing plant near Batesville, S.C., into operation soon.

**Pulp Mill:** Construction of a new pulp mill to replace the one destroyed by explosion May, '51 is currently in progress at the D. M. Bare Paper Co.'s plant, Roaring Spring, Pa. To cost approximately \$5 million, the

new facilities will greatly increase production—now close to 50 tons of book paper in 24 hours.

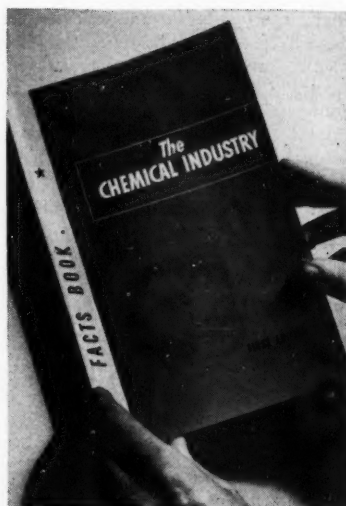
**Nitrogen:** Commercial Solvents Corp.'s nitrogen plant now under construction at Sterlington, La., will be completed and in production for the 1953-'54 fertilizer year. Cost: \$20 million; will double present output of nitrogen for agricultural, industrial uses.

## Get-Acquainted Nod

In smiling amiability, the chemical industry presents this week a "Facts Book" as the first step in its newly emphasized effort to get on friendlier terms with the general public.

Sponsoring the 108-page compendium is the Manufacturing Chemists' Assn., Inc., which regards the book as "the really basic piece in our public relations program." So far, 76,000 copies have been printed; a second press run is likely, and a new edition is planned for every two years.

While the bulk of the text was written and compiled by MCA's public relations counsel in New York, more than 200 officials of chemical com-



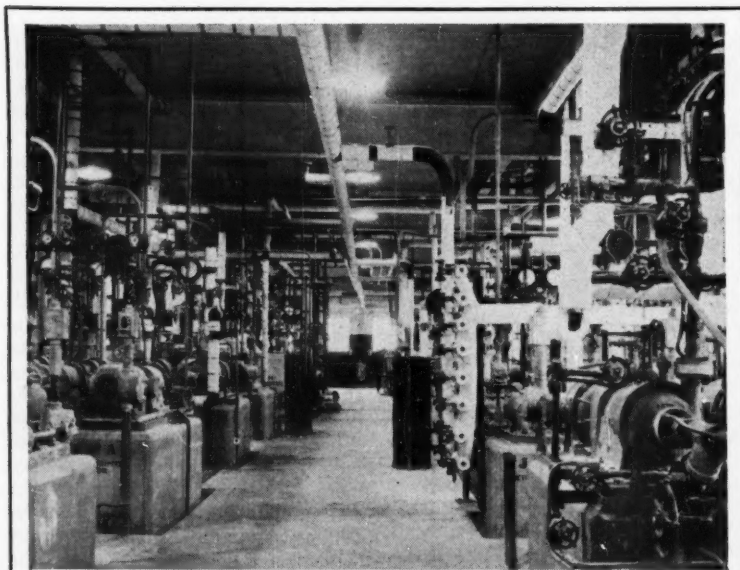
**MCA'S FACTS BOOK:** A cordial "hello" for the public.

panies helped to check, edit, correct and revise the 15 chapters. Prime movers in the task were members of a six-man subcommittee of MCA's p.r. committee. Chairman of this group was Harry Ferguson, vice-president of Allied Chemical & Dye; members were Prescott Fuller, American Cyanamid; Robert Gibson, chemical division, General Electric; Tom Jennings, Merck; Ralph Winslow, Koppers; and Henry Young, Interchemical Corp.

**Double Appeal:** While the Facts Book contains down-to-earth information and descriptions that help to explain the industry to laymen ("The cost of dyes in a man's suit is less than 1% of its retail price"), it also holds detailed statistics that will make it a handy addition to chemical company offices (sales of antiknock agents, actual and predicted, 1925-1975.)

MCA is distributing 15,000 copies to the press, leading government officials, educators, prominent speakers and other national "opinion leaders." Another 56,000 copies will be dealt out by MCA member companies to opinion leaders in their own communities; some companies also plan to give copies to key employees. Other copies are held by MCA for reserve and for sale at \$1 each.

Among benefits expected to come from the publication: a more neighborly welcome from communities in which a chemical plant is planned; a larger number of young people preparing for careers in chemistry; a better understanding of chemical firm's problems by governmental administrators and legislators; and more persons interested in chemical investments.



## Two Firsts in One Christening

**FORMALLY OPENING** its phenol-acetone plant this week, B. A. Shawinigan Ltd. logs two firsts: initial synthetic phenol production in Canada; world's pioneer commercial production of phenol and acetone from petroleum by the oxidation of cumene. Output (when capacity production is reached): 13 million lbs./year of phenol; 8

million lbs./year of acetone; 1 million lbs./year of  $\alpha$ -methylstyrene.

Design of the plant (out in the open to avoid undue vapor concentrations) is unusual in Canada; centralization of all services (such as the pump room shown above) makes the open plant practicable under Canada's severe winter conditions.

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**CHEMIGUM LATEX** is a nontoxic, water emulsion of tiny, discrete rubber particles. One of its newer, yet fully proved uses is in textile finishes that are truly different.

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dimensional stability, reduced shrinkage—all are lasting, low-cost advantages gained, when fabrics are treated with **CHEMIGUM LATEX**.

For more information on **CHEMIGUM LATEX** in textile finishes, or in sizings, coatings, backings, inks, dyes, and adhesives, write to:  
Goodyear, Chemical Division, Dept. M-2,  
Akron 16, Ohio.

**UNUSUAL HAND AND DRAPE:** Softer hand, more casual drape, smoother feel and greater body are permanently imparted to fabrics by **CHEMIGUM LATEX**.

**SOAP AND SOLVENT RESISTANCE:** **CHEMIGUM LATEX** finishes resist the soaps, solvents and detergents used in wet or dry cleaning—add life to the fabric.

**ADHESION AND STRENGTH:** **CHEMIGUM LATEX** penetrates and adheres to fibers, locks them in place—giving strength, tear resistance and dimensional stability.



Chemigum, Pliobond, Pliolite, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

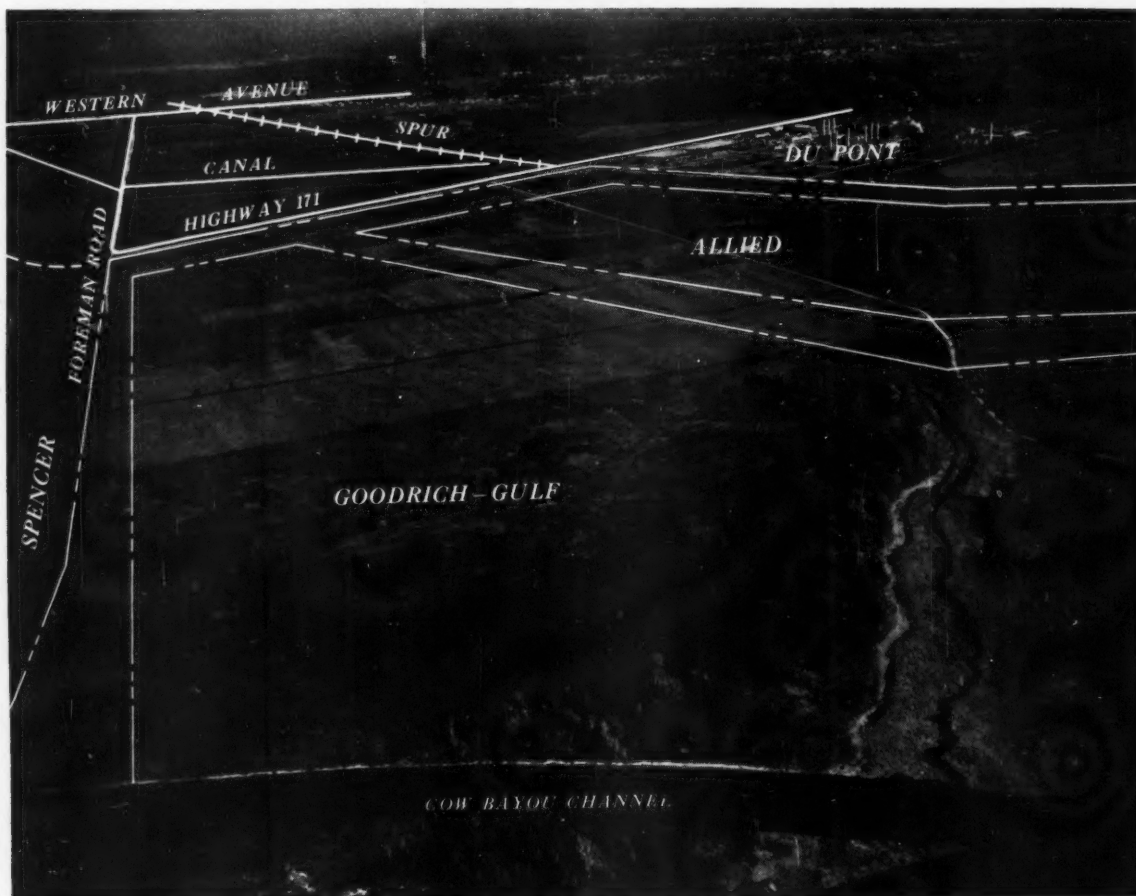


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**May 30, 1953 • Chemical Week**





BUILDING BESIDE ORANGE: Cutting a wide swath in Texas.

## A Standout in Texas

Latest sparkler in the Gulf Coast chemical diadem is Orange, Tex., where Allied, Spencer and Goodrich-Gulf are joining established (and expanding) Du Pont.

Behind these petrochemical investments: ethylene, deep water and barge transportation, plenty of good water, available sites, cooperation of local government.

There seem to be as many booming chemical locations in Louisiana and Texas as there are All-Americans on a professional football team. It's tough to stand out in such select company—whether industrial or athletic—but Orange, Tex., is currently doing just that.

Or at least, the chemical expansion, new construction and plans for the area make it seem so:

- Spencer Chemical has just decided to put up a 45-million lb. polyethylene plant on its 450-acre site (*CW Newsletter*, Apr. 4). Cost is estimated at \$25 million. Construc-

tion, to get under way in a few months, should be finished in the spring of 1955.

- Goodrich-Gulf Chemicals, jointly owned subsidiary of B. F. Goodrich and Gulf Oil, consummated a deal for a plant site (781 acres) early last month, but is still keeping mum about proposed products. The plant is not expected to be anything Texans need be ashamed of, for reportedly there is \$80 million in the kitty for future use.

- Allied Chemical & Dye's Nitrogen Div., which acquired 656 acres there last year, began construction last

January, expects to have the first unit (\$5 million) ready early in 1954. Products: ethylene oxide, ethylene glycol, diethylene glycol and triethylene glycol.

- Du Pont, the first of the large chemical companies to settle on Orange (started construction work on a \$22-million nylon chemical plant in 1945), has never stopped expanding. Present value of its Sabine River Works is estimated at \$100 million; and polyethylene, adipic acid and hexamethylene diamine are being expanded.

**Awesome Prototype:** If the other companies that are becoming Du Pont's industrial neighbors at Orange follow its example, the current investment in the area may seem comparatively small stuff several years hence. For Du Pont's plant started to grow on paper even before the first unit was built; original designs hadn't been completed when the company decided to more than triple the capacity of the nylon chemicals unit.

# How can new *A-C Polyethylene* fit into your picture?

A-C Polyethylene was formerly known as ALCOWAX



Bread Wraps



Dairy Cartons



For Upgrading Petroleum Waxes



Polishes



Printing Inks of All Types

#### OR OTHER USES such as . . .

- in making paper cups and dishes
- for leather treatment
- in varnishes and water paints
- in cosmetics
- as a lining for metal containers
- in manufacture of candles
- as a protective coating
- for latex dispersions
- in investment wax
- as a lubricating aid in processing plastics
- for fabricating and waterproofing

A-C POLYETHYLENE—in its present form—is a low molecular weight polymer that shows great promise as an ingredient for various film-forming materials. In appearance it is translucent white in color! And it is tasteless . . . substantially odorless . . . non-toxic!

THIS VERSATILE NEW material has a low density, is resistant to most chemicals at room temperature, as well as to water. In addition, it has excellent electrical properties.

ONE OF THE BIG ADVANTAGES A-C Polyethylene has over similar materials is *low viscosity*. And it is readily compatible with most waxes and wax-like materials. These highly desirable properties also make possible close formulation control. As a result of this ease of dispersion and retention in solution, these advantages enable you to self-blend compounds used in paper coating and in certain other operations. It's easier to handle . . . easier to blend . . . easier to use!

A-C POLYETHYLENE is supplied in grades No. 6 and No. 7, physical properties noted above, right. It can also be supplied in various low molecular weight grades that are readily emulsifiable, more soluble and dispersible, etc.

#### physical properties of currently available grades

	Grades	
	No. 6	No. 7
Mol. Wt. (Approx. Ave.)	2100	2100
Mt. Pt. °C	97/102	102/106
Hardness mm. 75° F	0.3-0.5	0.2-0.3
200 grams at 5 seconds Flash °F	470-495	480-500

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Semet-Solvay has a fully staffed laboratory to provide you with detailed technical information. Our technical representatives are available for consultation—without obligation—to:

- ✓ help you adapt A-C Polyethylene to your production processes
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Please send, without cost or obligation, more technical data plus samples.

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Petrochemical Sales  
**SEMET-SOLVAY DIVISION**  
 ALLIED CHEMICAL & DYE CORPORATION  
 40 Rector Street, New York 6, N. Y.

And shortly after this went into production, Du Pont realized that peacetime demand for nylon would outstrip its output. The answer was periodical expansion; consequently, hexamethylene diamine capacity today is several times that of six years ago; adipic acid output, two and one-half times greater.

So it was with polyethylene and methanol which Du Pont decided to make in Orange because of ample supplies of natural gas. Since the first polyethylene plant was ticketed for the Sabine River Works in 1946, capacity has been expanded fivefold. Currently construction crews are working on a project that will boost Du Pont's output of this booming plastic to an estimated 100 million lbs./year (CW, May 16). And methanol capacity is now two and one-half times what it was when first blueprinted in 1945.

**Convincing Incentives:** If Du Pont's evidence of the desirability of Orange as a chemical plant location were not enough, there is plenty more to attract firms. Not the least is the large quantity of ethylene Gulf Oil is making available to plants within piping distance of its Port Arthur refinery. Gulf is now supplying the Sabine River Works through a 6-in. line, and a second pipeline will probably be put in. The company will also take care

of the ethylene needs of Allied and Spencer, and possibly its half-offshoot, Goodrich-Gulf, as well.

Too, the large sites needed for such operations have been obtainable at good prices. Du Pont (which has 1,100 acres), Allied and Goodrich-Gulf bought theirs at a nominal price from H. J. Lutchter Stark, one of the leaders of Orange's Industrial Development Committee. Stark and his kinsman, Edgar W. Brown, Jr., grandsons of an Orange pioneer, are large landowners, but they are not in the real estate business, will make land available only if they think the plant will benefit the community. The fourth of the companies, Spencer, got the spot it wanted from nine farmers at a reasonable price.

These four sites are separated by an easement 250 ft. wide running the entire length of each site (*see areas marked off in picture*). Stark has retained these easements to give access to utilities and to permit drilling under any point of the area should oil be discovered.

Transportation facilities are excellent and varied. Two major railroad systems—the Southern Pacific and the Missouri Pacific—serve the area, and a transcontinental highway passes through Orange.

More important, there is both deep-water and barge transportation. The

Sabine River, dredged to a depth of 30 ft., meanders by these plants on its way to the Gulf. And the Intra-coastal Canal from the Mexican border to Florida, which is extensively used for barge shipments of chemicals and oil, passes through the city.

Adams Bayou, with a 100-ft. channel, serves the Du Pont plant, which transfers methanol, benzene and cyclohexane by barge.

City docks on the Sabine near the chemical plant area are being extended to give adequate deep-water facilities for handling liquid as well as dry cargoes. This is in accord with Orange's policy of extending docks to meet local requirements. (Du Pont, for example, now uses the docks to load deep-water vessels with methanol barged from the plant.)

**Out-Texasing Other Texans:** Probably no other area in Texas can brag of as plentiful a supply of good water as Orange:

- It has good underground water. Wells (they have to be only 450-650 ft. deep) give water of low mineral content, though iron content is moderately high.

- There's plenty of good surface water from the Sabine, the boundary between Texas and Louisiana for 285 miles. The Orange County Water Co.'s fresh-water canal supplies the area by tapping the river where its flow is a minimum of 200 gal./day, and both Cow and Adams Bayous, of course, are fresh.

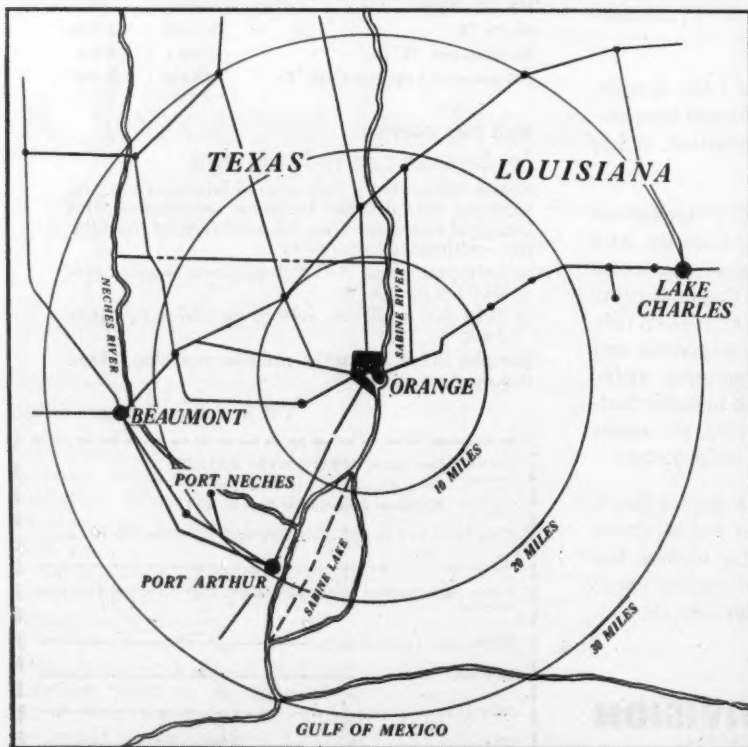
Orange is on the main line of the Gulf States Utilities between Baton Rouge and Beaumont. The power line is rated at 138,000 volts, a supply adequate for any contemplated development in the future.

United Gas and Texas Gas both have lines supplying the area, drawing in part on the local gas field.

**Look for Stability:** But above all these advantages has been the willingness of city and county governing bodies to sit down with company representatives to work out mutually satisfactory tax programs.

Orange has had booms in the past—1900, lumber; World War I, shipbuilding; 1923, oil; World War II, again shipbuilding, when the population hit 50,000. But none has been permanent, although some companies have naturally survived.

The current chemical boom, however, has no bust in its future. And local citizens who, when the city retrogressed after World War II, subscribed \$30,000 for a development fund to attract such industry, think it will give the community the stability they desire.



ALONG THE COAST: Among the select, a standout.



## No Closed Market

Nobody questioned the fact that silicone treatment can make masonry walls water-repellent, but Judge Roy W. Harper holds that the million-dollar law suit over this process is something less than water-tight.

In federal district court in St. Louis, Judge Harper last week dismissed Wurdack Chemical's civil suit against Dow Corning and Ranetite Mfg. Co., ruling that Wurdack's patent on the silicone treatment is invalid because the process had been in public use for more than a year before the patent was applied for.

Dow Corning has been confident of ultimate victory all along, but isn't sure that this is the end—the company rather regards this as the first round of a battle that might run along for another year or more. Wurdack is likely to appeal the decision, says it will definitely stay in the business.

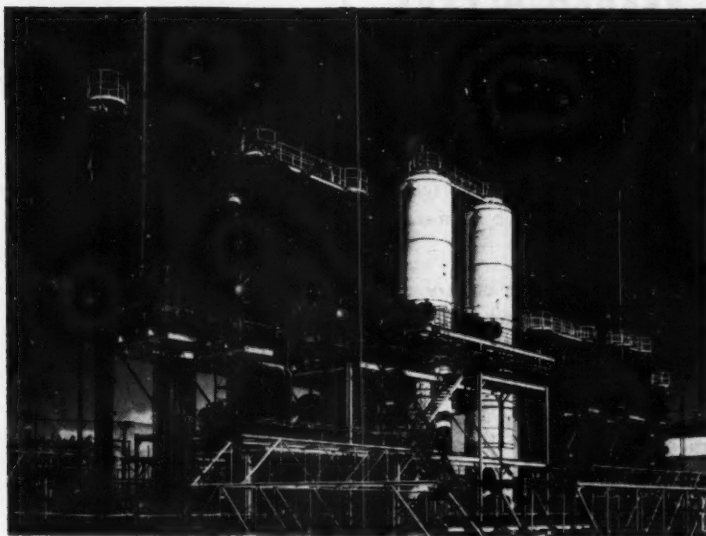
Wurdack's first patent application, in 1947, was turned down as too broad in scope. Then the firm began selling the water-repellents, sent in another application, and received a patent late in 1951. The suit against Dow Corning (one of the three U.S. manufacturers of silicones) and Rane-

tite (a St. Louis concern that uses the process) charged them with conspiring to infringe the patent.

## LABOR . . . . .

'See You Soon': More and more chemical labor contracts are being written to include sociable provisions for future get-togethers—wage re-opener clauses. Even more common among recent agreements is the amount of wage increase; most of the newer pacts call for wage boosts in the neighborhood of 5¢/hour. Among the latest pay boosts in this industry, four came through use of re-opener clauses. The crop includes:

- Linde Air and United Gas, Coke & Chemical Workers (CIO), Tonawanda, N. Y.—5¢ rise for 900 employees on wage re-opener.
- Celanese and United Mine Workers, Narrows, Va.—5¢ for about 2,200 employees.
- Chemical Mfg. Co. and UMW District 50, Ashland, Mass.—8¢ increase.
- Ethyl Corp. and UMW District 50, Baton Rouge, La.—two-year contract with adjustments ranging from



## Styrene With a Methyl

ITS PLANT at Midland, Mich., is well under construction, and Dow Chemical Co. expects to get into volume production of vinyltoluene by early 1954. The new material—tagged as a replacement for styrene—is the latest in a series of mon-

omers developed in Dow's research labs, will be aimed particularly at manufacturers of paint vehicles—styrenated oils, styrenated alkyds. Other replacement possibilities: synthetic rubber, rubber reinforcing resins, molding powders.

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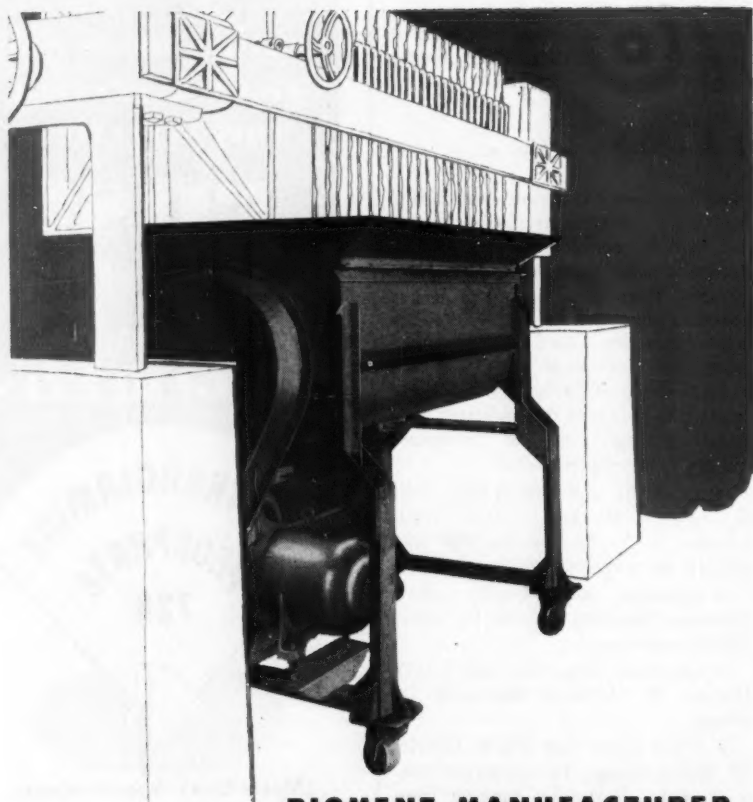
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## PIGMENT MANUFACTURER BREAKS PRODUCTION BOTTLENECK WITH READCO MIXERS

A large producer of water soluble paint pigments faced a problem confronting many management men...how to get more production—in a hurry.

In an analysis of his process, a bottleneck was found. Pigment solids were being removed from the emulsion in filter presses. Unmanageable filter cake was being scraped from the presses and shoveled into drums, a costly, time-consuming process.

A series of laboratory tests pointed out the simple solution. A battery of Readco Spiral Ribbon Mixers was installed beneath the presses. These mixers reduce the cake into a homogeneous, semi-liquid mass, ready for shipment. Processing time and costs have been greatly reduced.

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CORPORATION

BAKERY-CHEMICAL DIVISION, York, Pennsylvania—Los Angeles 39, California

## B & I . . . . .

2¢ to 7¢, bringing wage to \$2.45/hour, compared to 53¢ in 1945 (year of unionization).

- Southern Carbon and International Chemical Workers Union (AFL), Fairbanks, La.—5¢ increase.

- Pine Bluff Chemical (subsidiary of Food Machinery & Chemical) and ICWU, Pine Bluff, Ark.—pay hikes of 3¢ to 8¢.

- Calco Division of American Cyanamid and ICWU, Bound Brook, N. J.—1½¢ boost on second use of re-opener clause, making a total of 5¢ wage increase on current two-year contract.

- Hercules Powder and ICWU, Parlin, N. J.—5¢ on re-opener.

- Hercules and UMW District 50, Kenil, N. J.—increases ranging from 2¢ to 11¢ on re-opener.

- Goodyear Engineering and ICWU, Charlestown, Ind.—two-year contract grants 12¢ wage rise and re-opener clause.

- Ciba Products and ICWU, Summit, N. J.—5½% wage increment, various wage adjustments, and re-opener.

- Wyandotte Chemical and ICWU at former Pacific Chemical plant, Los Angeles—one-year contract with increases ranging from 10¢ to 20¢.

**Serenity Note:** Two settlements that ended or prevented strikes in Texas also are afloat in this week's news currents.

- About 175 employees of Jefferson Chemical at Port Neches have accepted a company offer after three months' negotiations. The employees, members of the CIO Oil Workers, had stayed on their jobs after the old contract expired April 20, but had voted to strike if necessary. Last points to be resolved were "inequities in job classifications and wages."

- "Trucks for truck drivers" was the issue at Du Pont's polychemicals plant at Orange, Tex. Some 26 truck drivers ended a one-week walkout when it was agreed that electricians would not drive any trucks except pickups.

**Governor Intervenes:** At Elizabeth, La., where more than 50 state policemen have been trying to keep peace while two AFL unions are striking against two paper mills, tension continues even though Gov. Robert Kennon has asked company and union leaders to meet with him in another attempt to reach a settlement. Seven truckmen were arrested near Eliza-

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with new

*the key is in the valve closing device*



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Unretouched photos of KRAFT-lok Multiwalls in use for packing at Stone Mountain Grit Company, Inc., Lithonia, Ga. A clear

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## B & I . . . . .

beth for hauling dynamite without permits. A week earlier, one of the companies' plant engineers was badly injured by a dynamite booby-trap while investigating damages caused by an earlier explosion. He lost his right eye, sustained a fractured spine, head injuries, and possible internal injuries.

## COMPANIES . . . . .

**Incorporations**, capital stock increases made news:

- Strong Chemical Corp. has been granted a charter in New York, listing capital stock of \$50,000.
- Bodine Chemical Corp. has been granted a charter of incorporation, also in New York, listing capital stock of 200 shares no par value.
- Index Chemical Co., Inc. has filed articles with the office of the Texas secretary of state, increasing its capital stock from \$5,000 to \$50,000.
- Shell Chemical Corp., Wilmington, Del., has been granted a Mississippi permit, listing capital stock of \$10 million.
- Industrial Metals and Chemicals, Inc. has been granted a charter of incorporation in Riverton, Wis., listing capital stock of \$350,000.

Three chemical companies recently received certificates of necessity for rapid tax write-offs from the Office of Defense Mobilization:

- Michigan Chemical Corp., St. Louis, Mo., calcium magnesite, \$242,000 at 25%.
- Allied Chemical & Dye Corp., Chicago, Ill., naphthalene and tar acids, \$529,000 at 60%.
- Stauffer Chemical Co., San Luis Calif., citric acid, \$2,869,298 at 45%.

The Beryllium Corp., Reading, Pa., has filed with the Security Exchange Commission a registration statement covering 88,385 shares of common stock. Its intent: to offer the stock to stockholders of record June 5, '53, on the basis of one additional share for each four shares held.

Proceeds from the financing will be used for modernization and expansion.

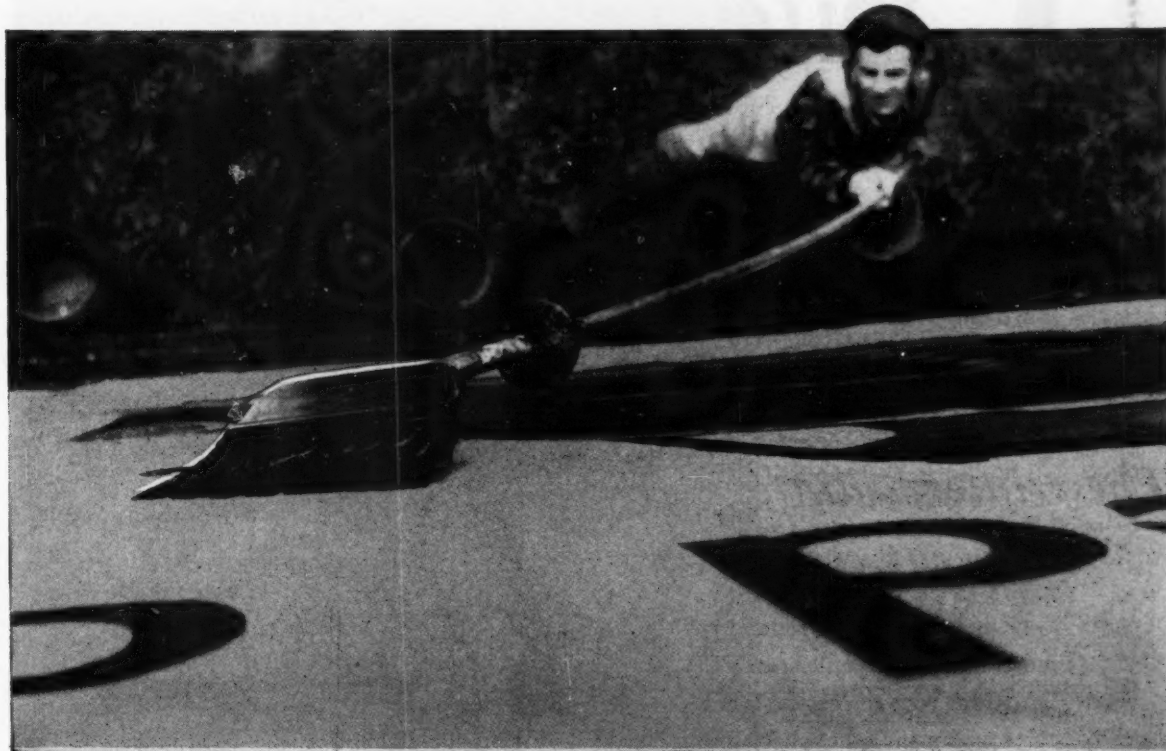
Tellepsen Construction Co.'s subsidiary, Tellepsen Petro-Chem Constructors, has been awarded a general contract for the construction of a bleached kraft paper mill, Evadale, Tex., for East Texas Pulp and Paper Co. Cost (including equipment): in excess of \$20 million.

The plant is due to be completed and in production by early 1955.



# DOWICIDE PRESERVATIVES CONTROL BACTERIA GROWTH IN ADHESIVES

You can prevent loss of viscosity and odor "build-up" in adhesives by using DOW industrial preservatives



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Department DP-23  
Midland, Michigan

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The adhesives industry is just one example where DOWICIDE® PRESERVATIVES solved a serious mold and bacteria problem. Working with Dow's technical staff, this industry was able to suppress damaging mold and bacteria growth in water-soluble, starch-based adhesives during the manufacturing, storage and use periods. Today, DOWICIDE PRESERVATIVES are giving adhesives of all kinds longer life and greater sales appeal.

DOWICIDE PRESERVATIVES are controlling mold and bacteria for a variety of industries including textile, leather, latex paint, paper, lumber and many others.

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# DEC DMC DMIC

**beta-Diethylaminoethyl Chloride Hydrochloride**

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*These intermediates  
may cut costs for you*

Give them a try. DEC for antispasmodics, DMC for antihistaminics, DMIC for your analgesics. You may agree with many other pharmaceutical producers that these intermediates work a little better, and cost a little less.

Whether you want a pilot sample or a considerable quantity of uniformly pure materials, we believe you'll like the prompt, efficient service you get from Michigan Chemical Corporation.



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B & I . . . . .

## FOREIGN . . . . .

**Manpower Shortage/Canada:** Unless more undergraduates go in for chemistry within the next four years, a crippling blow may be dealt to Canada's expanding chemical industry, says G. H. Guest, staff development consultant, Chemical Industries Ltd., Montreal. By 1956, the industry will be short 1,300 men—600 chemical engineers, and 700 chemists—if enrollments don't pick up.

**Synthetic Glue/Spain:** The Union Quimica del Norte is reported to have ended negotiations with a British firm for the manufacture of synthetic glues in Spain. Other developments of note: the Barcelona firm, Industria Titan is building a factory to turn out varnishes and resins, claimed to be one of the largest in Europe; the Union Espanola de Explosivos is to manufacture containers of polyvinyl chloride and polyethylene at its Santander factory.

**Hydrogen Peroxide/Greece:** The Chromatourgia Pireos S.-A. has built a hydrogen peroxide plant reported to be completely automatic, able to produce hydrogen peroxide of any concentration. Present capacity: 400 kilos/day (of 35% solution), more than adequate for domestic needs. Capacity is soon to be doubled.

**Chlorophyll/India:** Research is being conducted at the Forest Research Institute, Dehra Dun, India, to help in the establishment of a chlorophyll industry in that country. A process is reported to have been developed for the preparation of soluble copper chlorophyllin and also for water-soluble chlorophyllin without copper.

## KEY CHANGES . . .

**Herbert P. Buetow:** To president, Minnesota Mining & Manufacturing Co., St. Paul, Minn.

**Louis W. Cabot:** To vice-president and treasurer, Godfrey L. Cabot, Inc., Boston, Mass.

**Herbert S. Wilkinson:** To vice-president, Abbott Laboratories, North Chicago, Ill.

## KUDOS . . . . .

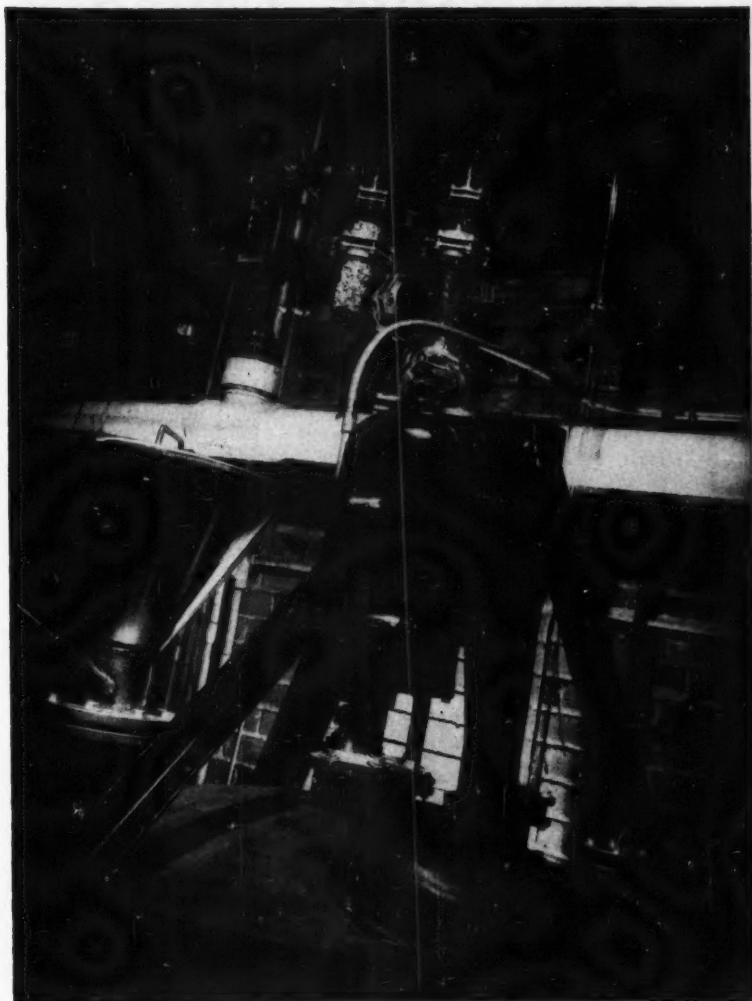
**Charles Munson:** To receive the 1953 Society of Chemical Industry Award for meritorious achievement.

## DIED . . . . .

**James W. McLaughlin:** Vice-president, Union Carbide and Carbon Corp., New Rochelle, N.Y., May 15.

**Chemical Week • May 30, 1953**





# Hydrogen Peroxide And Peracetic Acid In Organic Synthesis

Manufacturers are using hydrogen peroxide and peracetic acid increasingly for oxidation reactions, epoxidation, hydroxylation, ring-splitting reactions, quinone formation, and free radical reactions. Such reactions are used in the manufacture of insecticides, waxes, resins, plasticizers and stabilizers, cortisone, anti-histamines, germicides, synthetic plasma, organic intermediates and many other products.

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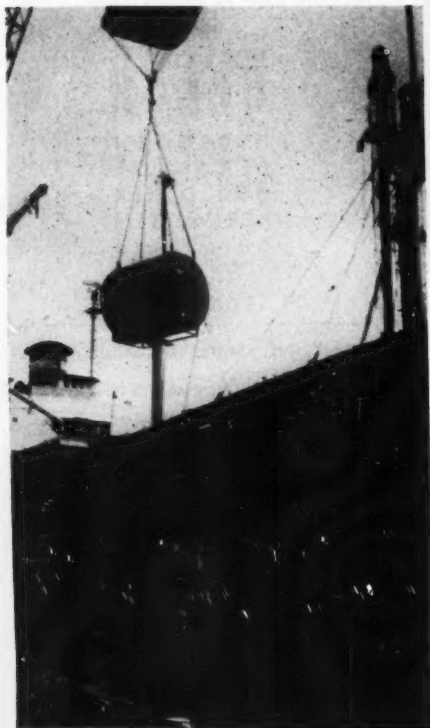
## 'Tween-Size Tanks



**NEW SIZE:** California's Transit Tank Co. develops a chemical container for . . .



**GONDOLA TRANSPORT:** Filling the gap between drums and tank cars, the tanks range in size from 300 up to 4,000 gal.



**OCEAN TRANSPORT:** For liquid and dry chemicals, a convenient package.

**W**EST COAST chemical shippers appear to be stealing a lead on their eastern counterparts in one respect at least: They've developed and are fast adopting an in-between-size series of tanks—something to fill the gap between 55-gal. drums (for most chemicals), “ton tanks” (for a few selected commodities), and the standard 8-10,000 gal. tank car.

The new series, a few of which are pictured on this page, is a group of cubical or cylindrical tanks ranging from 300 up to 4,000 gal. capacity. Depending on size, four to six such tanks can be loaded on a single railroad gondola car. Two will fit on a truck. But significantly, they do not tie up either the gondola or the truck. At either end of the trip, the tanks can be hoisted off the vehicle and used as added storage capacity.

West-coasters first took to the idea in force, however, because of the tanks' convenient size for sea-going shipments. With incoming chemicals from the eastern seaboard, and growing trade with Alaska, Japan, Hawaii, Philippines, and the South Sea Islands, west coast manufacturers have been seeking better facilities for chemical ocean transport.

This was the situation in 1950 when Fred Parr, a Richmond, Calif., industrialist and terminal operator, established the Transit Tank Co. to manufacture medium-size tanks for his terminal operations. Parr's nephew, 32-year-old Fred Parr Cox, took over the actual running of the business. It wasn't long before Cox found that his tanks were in demand by concerns other than his uncle's. Soon oil companies (such as Union Oil and Standard of California), chemical makers, construction firms, and government agencies were experimenting with them.

Cox now figures that over 1,000 tanks are “on the road.” New ones are being made at Richmond, Los Angeles and New Orleans. Production rate is 36 large tanks a day, and 120 a day of the 300- and 600-



# Unlimited Capabilities

The Magi of old were held in great esteem because they were thought to have unlimited powers over all the forces of nature. They were the "good" magicians. Their opposites, sorcerers who practiced black magic, were believed to have power only over the forces of evil.

Like the Magi of old, Allyl Chloride offers unlimited capabilities for "good" in many fields. It is the key to Shell's synthetic glycerine, to Epon® resins, and other important products in the resin and plastics fields. It is an intermediate in the production of pharmaceuticals, insecticides and dyestuffs.

Allyl Chloride has many other interesting possibilities for new products . . . possibilities that await only your exploration.

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## DISTRIBUTION . . . . .

gal. sizes. Most of them are made of hot rolled steel, a few are made of stainless steel, and the balance of high-tensile steel for liquefied petroleum gases. Transit Tanks also makes containers lined with rubber, glass or plastic.

For materials like asphalt, the company has developed heat exchangers and spun-glass insulators. Normal routine is to lease the tanks at \$25-30/month for the large sizes, \$5-7/month for the smaller containers. As a logical next step, the company is now inaugurating a regular tank service—on a tariff basis—for established commodity movements. Whenever possible, the tanks carry a full load on both outgoing and incoming trips. Containers sent to the Philippines, for instance, carry coconut oil on the return voyage.

**Prospects:** Cox is convinced that he has barely scratched the market for his in-between-size tanks. Having proved their worth on the Pacific,

they are catching the interest of eastern traffic managers who have extensive across-the-continent shipping problems. Contamination factors and too-small quantities have made many commodities unsuitable for the deep-tanks of coastal freighters. Now the savings of ocean freight can be realized.

It will be more difficult, however, to shake the position of tank-truck movements in the more-congested eastern areas. Here—on a size-for-size basis—Transit's tanks will be in direct competition. They will have to prove their value in terms of convenience, flexibility, service.

But symptomatic of the possibilities is a contract Cox is now negotiating with the Mexican government. That country likes to buy in tank-car quantities, but it often encounters U.S. shippers who are unwilling to send their tank cars across the border. Transit tanks on gondolas might be the answer.



## Chemicals on the Platter

TWO SUPPLIERS to the phonograph record trade have recently used music as a selling medium. Pictured above is Monsanto Chemical's contribution to American musical folklore: a plastic platter that features a room-boomp "Monsanto March" and a foot-tapping "ONB Samba." Both numbers were composed and recorded by pianist Russ David and the other members of his Don Juan Quartet.

Since neither song has lyrics, most of the selling message had to be printed on the cardboard jacket. It explains that "ONB"

stands for ortho nitro biphenyl—a flow aid used in manufacturing unbreakable records.

The other musical contribution comes from a carbon black producer, J. M. Huber Corp. Instead of commissioning new music, Huber chose to re-press two RCA Victor collectors' items: a 1902 Vess Osman recording of "Tell Me Pretty-Maiden," and a couple of John Philip Sousa items dating from 1926. Mailed with the current issue of Huber News, the disc helps to celebrate the record industry's Diamond Jubilee.

# OILS      FATS



**When it comes to  
COCONUT  
FATTY ACIDS  
AND ITS DERIVATIVES  
DREW IS  
FIRST AND FOREMOST**

## DREW LAURIC ACIDS

APPROXIMATE CHEMICAL COMPOSITION	AAB %	ABL %	AB %	ABH %	AAAR %
Caproic C6	—	—	—	—	—
Caprylic C8	2.0	1.5	1.0	1.0	1.0
Capric C10	4.0	3.5	3.0	3.0	2.0
Lauric C12	98.0	70.0	60.0	60.0	45.0
Myristic C14	2.0	13.0	10.0	10.0	22.0
Palmitic C16	—	8.0	7.0	7.0	11.0
Stearic C18	—	1.0	1.0	0.0	2.5
Oleic C18	2.0	3.0	7.0	3.0	11.0
Linoleic C18	—	—	3.0	—	5.5
Linolonic C18	—	—	—	—	—
APPROXIMATE CHEMICAL DATA	AAB	ABL	AB	ABH	AAAR
FFA	130-144	130-141	126-132	126-132	110-120
TITRE °C	37.0 Min.	30.0 Min.	24-28	29	30.0 Max.
IODINE VALUE	3.0 Max.	5.0 Max.	0-10	3.0 Max.	14-22
ACID VALUE	277-287	275-281	251-263	251-263	222-253
SAP. VALUE	277-287	275-281	251-263	251-263	222-253
COLOR	15.0/2.0	20.0/3.0	20.0/3.0	15.0/2.0	35.0/5.0

Take **LAURIC ACIDS**, for instance

... notice the

- **WIDE CHOICE**
- **OUTSTANDING QUALITY**

Drew markets a variety of Lauric Acids, individually tailored to specific needs in the chemical, drug and cosmetic fields. Continual development of diversified physical properties makes it possible for you to select exactly the right Lauric Acid for your formula. And Drew's consistent uniform quality gives you a *plus* factor that means a head start for your product.

Write for booklet, "DREW FATTY ACIDS" and copy of Drew's new chart, "OILS AND FATS".

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INVESTIGATE THESE  
NEW TRONA BORON  
CHEMICALS**



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- (c) Tri (methylamyl)
- (d) Tri-n-dodecyl
- (e) Tri (tetradecyl)
- (f) Tri (tetrahydrofurfuryl)
- (g) Tri (2-ethylhexyl)

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## DISTRIBUTION.....

### New Labeling Guide

A revised edition of "Manual L-1: Warning Labels" has been issued by the Manufacturing Chemists' Association (Washington, D.C.). It replaces the 1945 manual which has become the basis for most state laws on chemical labeling practice, bringing up to date the efforts of MCA's Labels and Precautionary Information Committee.

The new edition, 98 pages in length, includes illustrative labels for 250 industrial and agricultural chemicals, as well as outlining the principles involved in the development of proper warning labels.

**Other Booklets:** Here are additional offerings of industrial literature:

- A technical bulletin describing Plastolein 9057 DIOZ, a new monomeric plasticizer—from Emery Industries, Inc. (Cincinnati, Ohio).
- "Europe and her Trade Fairs," a 32-page booklet on this year's European commercial-fair programs—from the European Travel Commission (New York).
- A marketing guide for "Concentrated Water-Soluble Fertilizers"—

from Monsanto Chemical Co.

- A bulletin on "Liquid Fertilizer Advertising"—from the National Better Business Bureau (New York).

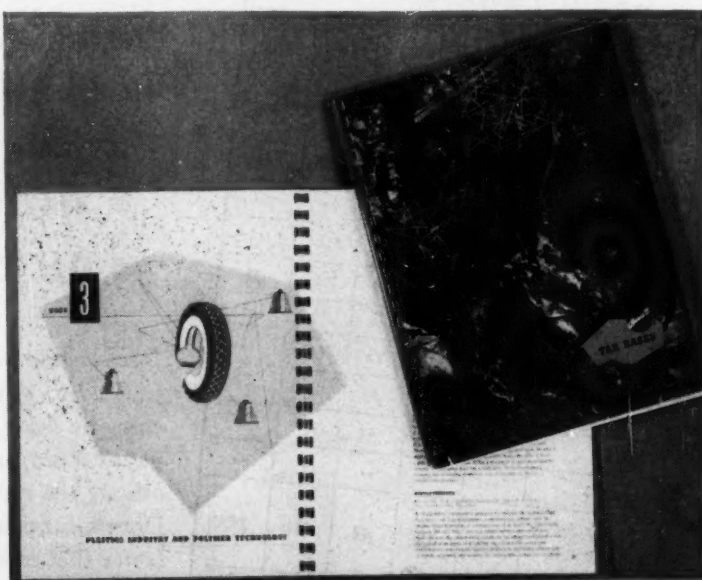
- The composition, analysis, and uses of "Metallic Stearates"—from M. W. Parsons-Plymouth, Inc. (New York).

- "Meet Sylvania Cellophane," on the film's history, manufacture, and use—from American Viscose Corp. (Philadelphia, Pa.).

- A new catalog of radioactive and stable isotopes—from Union Carbide and Carbon Corp. (Oak Ridge, Tenn.).

**Chicago Agent:** The Sherman W. Putnam Organization, Inc. (Chicago) has been appointed as a Styrofoam distributor by the Dow Chemical Co.

**Up-Grading:** The Synthetics Dept. (synthetic resins for paints, varnishes, lacquers, and adhesives) of Hercules Powder has redesignated its St. Louis sales branch. Formerly a sub-office, it will now be a full-fledged territory headquarters. At the same time, a new sub-office was opened in Houston.



### Science Can Be Artistic

THE DAY must soon be arriving when no corporate executive staff will be complete without an art director. With most company annual statements now face-lifted, the proponents of the artistic touch seem to be tackling other corporate publications.

A case in point is this newly published volume describing "Barrett Tar Bases." Decorated with modern-art motifs from preface to bibliography, the 96-page book discusses the uses, properties, reactions, and handling of tar derivatives.



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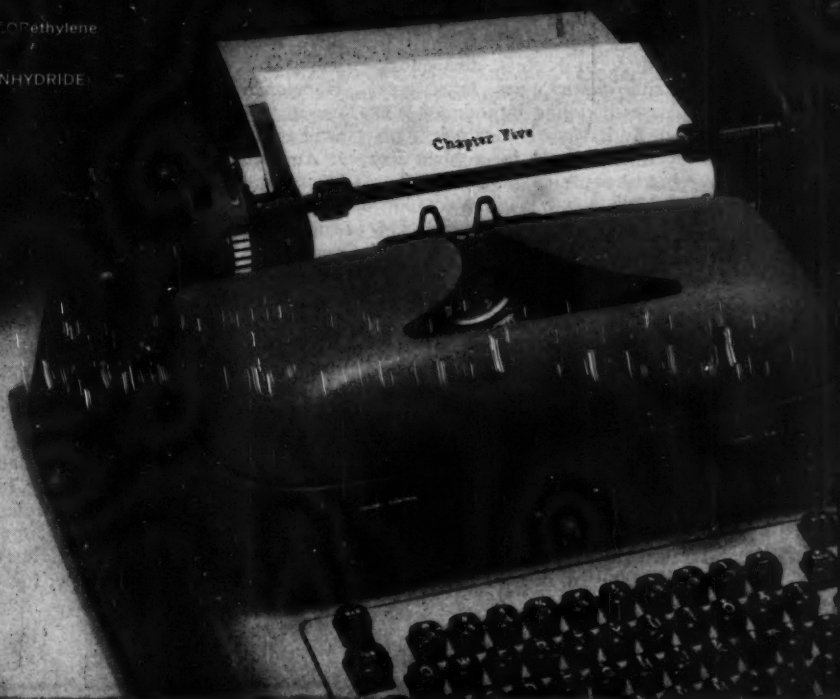
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# RESEARCH . . .

**These developments set the pace for a year of synthetic rubber research progress.**

Development	By whom
Chemigum S. L. polyester	Goodyear Tire & Rubber
Fluorocarbon rubbers	Minnesota Mining & Mfg.
Hypalon	E. I. du Pont de Nemours
Nitrazole C. F. catalyst	Firestone Tire & Rubber
Pipeline polymerization	B. F. Goodrich Chemical
Rosin-extended GR-S	U. S. Rubber and others
Steam-jet dispersion	Copolymer Corp.
Sulfoxylate activator	Naugatuck Chemical Div.
Vulcollan polyester	Bayer, Leverkusen

## Timetable of Achievement

An impressive string of significant synthetic rubber developments, stretching back to the middle of last year, is still lengthening. Confirmation of this happy state of affairs comes from the laboratories of Naugatuck Chemical Div. of U.S. Rubber Co.

In a tersely worded report, Naugatuck last week claimed credit for: "a new chemical activator that will reduce the manufacturing costs of GR-S cold synthetic rubber, speed up its production and make a more uniform product . . ."

The triple-threat material in question is tagged only as "a sulfoxylate derivative"—and that's as far as the company is willing to go in identifying it at this time.

According to reports, the anonymous sulfoxylate gives latex good color, eases handling by increasing its fluidity. And, says Naugatuck, "laboratory tests indicate the rubber may have better aging characteristics than present types due to low iron content."

Naugatuck's claims for "a more uniform product" and "low iron content" make sense in the light of one unique feature of the new activator: it's utilized in water solution. There aren't any particles to worry about; so variation in particle size isn't a problem as it can be with activator slurries prepared by the reaction of ferrous sulfate and potassium pyrophosphate. Result: a more uniform rate of activation; a more uniform rubber; and less iron.

Reconstruction Finance Corp. has authorized two plants to turn out about 600,000 lbs. of cold GR-S with

the new activator. They're located at Port Neches, Tex. (operated by U.S. Rubber) and Baton Rouge, La. (operated by Copolymer Corp.). Bearing RFC code number X-750, the rubber will be a general-purpose cold GR-S.

Judging from the recent fast pace of research progress in synthetic rubber technology, this new Naugatuck development was slightly overdue. Important technical achievements have been bowing in, almost one a month, since last spring:

**April:** The Du Pont Co. takes the wraps off its Hypalon chlorosulfonated polyethylene. The new polymer shows outstanding resistance to ozone oxidation, stands up well to abrasion, heat, weather, oils, and most chemicals. Still in pilot-plant production, Hypalon has nevertheless found some use in footwear finishes, colored sidewall tires and ozonator gaskets.

**August:** Nitrazole CF, Firestone Tire & Rubber Co.'s unique polymerization catalyst, makes its debut (CW, Aug. 2, '52) after five years of research. It's *p*-nitrobenzenediazonium-*p*-chlorobenzene sulfonate, puts styrene and butadiene together at 122 F in much the same way the cold process does it. Nitrazole CF hasn't prompted RFC to abandon cold rubber manufacture; but it is in the running for use in new plants, and as a replacement for worn cooling units.

**October:** Minnesota Mining & Manufacturing Co. unveils (CW, Oct. 11, '52) its dihydroperfluoroalkyl acrylate polymers. Developed under Air Force sponsorship, the new polymers boast outstanding resistance to ozone, fuels,

lube oils, hydraulic fluids, etc. Moreover, they're easily vulcanized, reinforced with carbon black. High cost, however, sharply limits civilian applications.

**November:** From overseas comes word of Vulcollan (CW, Nov. 8, '52). Bayer's (Leverkusen) synthetic polyester. It's a condensation polymer of glycols and adipic acid, is—according to the Germans—easily molded and tougher than natural rubber and GR-S. High cost and processing problems are drawbacks.

**January:** Rosin steps into the lime-light (CW, Jan. 24) as the vital ingredient in a new high-rosin GR-S stemming from the research efforts of Naugatuck Chemical Div. (U.S. Rubber Co.), Hercules Powder Co., and others. The rosin-extended synthetic is more resistant to abrasion than standard cold rubber, has better tensile strength. Principal commercial promise: in tire treads.

And B. F. Goodrich Chemical Co.'s pipeline process (CW, Jan. 17) bows in. The technique polymerizes styrene and butadiene in stainless steel pipes rather than the conventional pressure vessels, cuts process time by 50-fold. Product looks as good as, but not better than, cold GR-S. Like Nitrazole CF, the pipeline process could work some drastic changes in GR-S manufacture. But here, too, the change won't come overnight; more likely, the Goodrich process will be a shining candidate for new plants.

**February:** Next act in the synthetic show is Goodyear Tire & Rubber Co. Goodyear's entry: a tough condensation polymer of adipic acid, ethylene and propylene glycols (CW, Feb. 7) similar to Vulcollan. Recently christened Chemigum S.L., the Goodyear rubber is cheaper, easier to process than the related German product. Selling points: markedly higher abrasion resistance than cold GR-S; superior tensile strength, oil and oxidation resistance. Promising uses: in tire treads; shoe soles and heels; flooring; and industrial rubber products.

**March:** Copolymer Corp. reveals (CW, Mar. 28) its steam-jet process for mixing latex and carbon black. The method, hinging on a three-way jet-like fitting for feed lines of GR-S plants, uses high-pressure steam to disperse a carbon black slurry through the latex. Advantages include: reduced process costs; elimination of wetting agents needed in masterbatch production; and a tougher product.

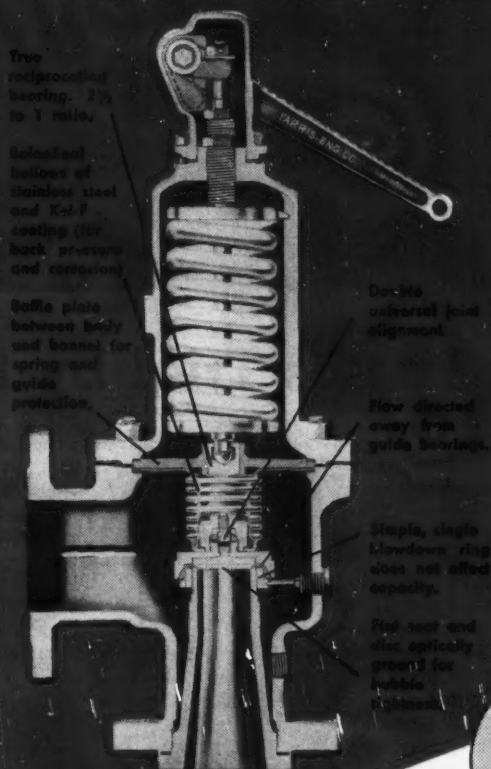
That the pace can be maintained is conjectural. But one thing is sure: there will be little time to rest. The industry's chemists and engineers will be getting their second wind in the sprint to put their discoveries to profitable work.



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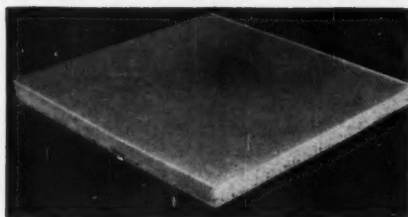
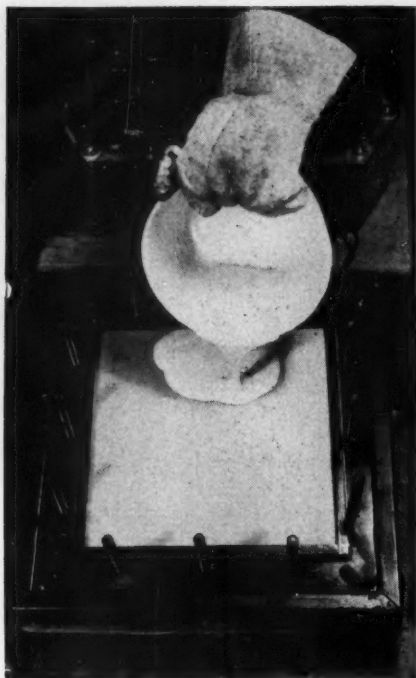
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## New Silicone Foam Passes Trial by Fire

The owner of the hand (shown in mirror, right) isn't bent on self-destruction. Although the flame has heated one side of the half-inch section of foamed plastic to cherry redness, the opposite side is not too hot to hold. The superior insulator is silicone foam made from one of Dow Corning Corp.'s new XR-543 and XR-544 resins.

First applications of the new foams will probably be in the aircraft industry. And here's how they'll be used: a liquid mix of XR-544, for example, may be poured (upper left) over a silicone-glass laminate in a heated form, covered with another sheet of laminate, and foamed in place. Product is a sandwich (lower left) that combines heat stability with a high compressive strength-to-weight ratio.

Less than one-tenth as heavy as aluminum, these silicone sandwiches show special promise as aircraft structural materials.

Dow Corning reports that its new silicones can be expanded to form "uniform, unicellular structures weighing . . . 8 to 24 lbs. per cu. ft." And, says the company, "such structures have been exposed to temperatures of 700 F for over 20 hours with very little structural or dimensional change. Tests indicate that silicone foam will retain its physical properties for long periods of time at temperatures in the range of 500 F."

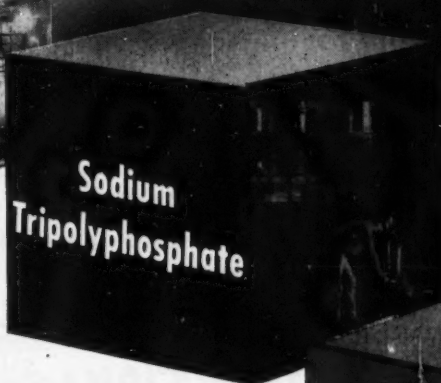
Briefly, here's how the resins are handled. They're supplied as clear 100% solids that are easily melted. Blowing agents and catalysts may be added during mechanical mixing of

the molten resins. The hot mixture is then transferred to a container and heated at a predetermined temperature to produce the required foam density. After a specified time, the temperature is gradually raised and the foamed resin given a final cure.

Cured foams can be carved, cut and machined to desired shapes with conventional wood working tools. And foams may be dyed by adding heat-stable pigments to the mix before blowing.

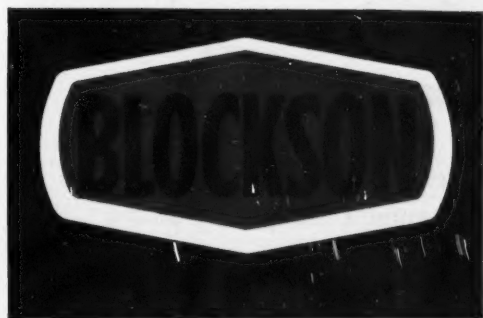
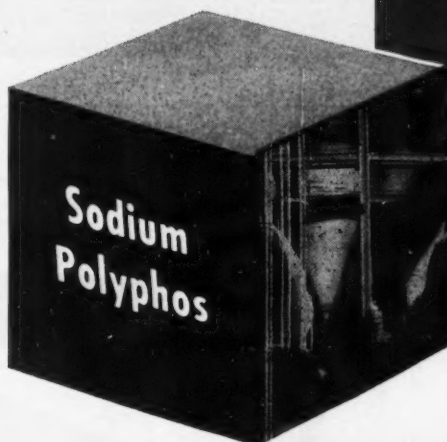
All hopes for the new silicones are not pinned to the aircraft industry, however.

Dow Corning says it also foresees applications for the foams in fire walls; heat-stable buoyant structures; thermal, electrical and acoustical insulating bodies.



# Sodium Phosphates

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	MONOSODIUM PHOSPHATE Anhydrous • Monohydrate

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## RESEARCH . . . . .

**Buildup:** Air Products, Inc. (Allentown, Pa.) broke ground recently for a new research laboratory. Part of what Air Products calls its "long-range building program," the proposed unit is the first of six that will eventually comprise the company's research department. Site of the building, now under construction, is on a 31-acre tract on Allentown's southeast limit.

**New on the Lists:** Nineteen entries have just been made on Schwarz Laboratories' roster of available optically standardized amino acids. Included: L-asparagine; L-aspartic acid; L-cystine; L-leucine; L- and D-glutamic acid; L- and D-methionine; L- and D-serine; and L- and D-phenylalanine.

• Also expanding its range of products is Midcontinent Chemicals Corp. The Chicago firm has added a number of chelating agents and organic intermediates of potential value in the synthesis of dyestuffs and pharmaceuticals. Now available: benzoylacetone; isovalerylacetone; 2-acetylthiophene; 2-acetylfuran; 2-thenoyl-trifluoroacetone; 2-furoyltrifluoroacetone; methyl-n-perfluorobutyrate.

**Open for Business:** Cambridge Applied Research, Inc., a new independent consulting laboratory, is now in operation at Belmont, Mass. Specialty: metallurgy, solid state physics.

**Identification Aid:** Purdue Univ. researchers have devised a new technique for differentiating aureomycin and terramycin on chromatograms. Here's how it works: a 2% solution of p-dimethylamino-benzaldehyde in 1.2 N hydrochloric acid is sprayed on the chromatogram. After five to eight hours, aureomycin shows up as a dirty-yellow spot, terramycin as a blue-green. Value of the new method: in screening new antibiotic substances.

**Pressure Dividend:** Another high-pressure acetylene derivative is commercially available from General Aniline & Film Corp. It's 2-pyrrolidone, a five-membered heterocyclic ketone used as an intermediate in the production of pharmaceuticals, cosmetics and textile chemicals. According to GAF, the compound should also be of interest as a selective solvent.

**Deadline:** Effective July 1, National Bureau of Standards will adopt a new value for the viscosity of water: 1.0038 centistokes at 68 F in place of 1.0070 centistokes, the value currently in use.



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## Briefs

### From recent literature

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**2-Mercapto-oxazolines** can be synthesized by reacting a 2-amino alcohol, such as monoethanolamine, with carbon disulfide at low temperature in the presence of iodine.

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**Metal cleaning** and rustproofing composition capable of removing oil and grease coatings, while not exposing metal surface to corrosive action or rusting, may be compounded using kerosene, triethanolamine oleate, cobalt naphthenate and water. Upon treatment with this composition, a protective film is left on the metal surface which may be flushed away with water or allowed to remain before applying paint.

*These developments are abstracted from recent publications or U. S. patents. They may suggest applications of Jefferson Ethanolamines in your products or processes.*

# PRODUCTION . . . . .

Photosensitization has been applied commercially to convert

benzene plus chlorine	to	benzene hexachloride (and lindane)
toluene plus chlorine	"	benzyl chloride and xylene
ergosterol	"	vitamin D
7-dehydrocholesterol	"	

and worth watching for imminent industrialization are these u-v reactions:

vinyl chloride	→	polyvinyl chloride
ammonia	"	hydrazine

But largely because of its need for fragile glass and quartz equipment (in order to transmit radiations), photochemistry has gained only slow acceptance. Should this 'fragility factor' be surmounted, there are many more reactions that could well pique commercial curiosity. For example:

methane plus chlorine	→	carbon tetrachloride
pentane plus chlorine	"	1-chloropentane
hydrogen plus chlorine	"	hydrochloric acid
sulfur dioxide plus chlorine	"	sulfuryl chloride
sulfur dioxide	"	sulfur trioxide
ethane	"	acetic acid
hydrogen plus bromine	"	hydrogen bromide
fumaric acid	"	maleic acid
cyclopentanone	"	cyclobutane

## Chemicals in the U-V Spotlight

After several false starts, photochemistry promises to come into its own as a flexible tool for the man in the plant. Equipment makers and process development men have teamed up to explore its possibilities and their interest now indicates a bright commercial future for photochemical reactions.

In simplest terms, photochemistry means subjecting a substance to light in order to induce a chemical reaction: oxidation, reduction, synthesis, decomposition, hydrolysis, hydrogenation, halogenation, bleaching, polymerization or isomerization. The fundamental concept, of course, has been long recognized. And commercially, it has been adapted to the production of benzene hexachloride (BHC) and its gamma isomer, lindane; benzyl chloride; and Vitamin D.

But those are only isolated filaments in the photo fabric. When you pull them apart, the whole complicated structure begins to unravel, point-

ing up a whole series of significant reactions.

Although all of the companies actively working on photo reactions are keeping their results to themselves, there is little doubt that many of them have moved out of the laboratory and into the pilot plant.

One likely outlet for ultraviolet equipment, for instance, is in polymerizations. The literature indicates that polyethylene and polyvinyl chloride can be made with the aid of u-v light. Acme Resin (Chicago) has done a lot of work on photopolymerizations, has recently purchased additional equipment. And De Bell and Richardson (Hazardville, Conn.), which has experimented with the photopolymerization of vinyl chloride, reports that it's a quick and slick reaction allowing no chance for contamination of the product.

Photochemical decomposition of ammonia to produce hydrazine has also been proposed (CIW, March 17,

'51). Early indications were that it was too expensive for commercial exploitation, but it can't yet be counted out as a possible hydrazine process.

Another tried—and ticklish—subject is the photochlorination of toluene. It was first attempted by Dale & Stein (now Benzol Products) in its Piscataway (N.J.) plant over 25 years ago. The firm made xylene by shining u-v light through a port hole in a kettle containing a mixture of chlorine and toluene. It is still using u-v lamps, but, like others in the field, it is not talking about applications.

**Three and One:** Both Westinghouse and General Electric turn out mercury arc lamps to convert electric energy into u-v light. Hanovia Chemical and Manufacturing (Newark, N.J.), however, is probably more active in the field, turns out special lamp units for chemical plants. A newcomer in the u-v picture is The Pfaudler Co. (Rochester, N.Y.). While not making any lamps, it will engineer a u-v unit



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**Matter of Meaning**

Words take on a different meaning for different people, and ultraviolet is no exception. Webster defines it like this: "Outside the visible spectrum at its violet end." To the purist, it signifies all light waves shorter than 3,800 Angstroms. Actually, most photochemical reactions take place in the "near ultraviolet," i.e., 3,000-4,000 Angstroms. Mercury arc lamps reach well into the visible spectrum with their radiations, but they are the most efficient means yet discovered of converting electrical energy into ultraviolet energy.

utilizing its glass-lined equipment.

The big selling point of the lamp manufacturers now is cost. They figure that the original lamps were expensive, cumbersome, relatively inefficient. But prices have been pared while outlay for other equipment items has gone up. Presently, the price of a u-v unit ranges between \$1,000 and \$1,400, depending on size, outlets and other factors. A 1,200-watt bulb can turn out 50 lbs. of BHC an hour.

**Building Blocks:** The literature on ultraviolet reactions is massive and complex. But the investigative highlights boil down to these few:

- Absorption of u-v radiation imparts increased kinetic energy to certain molecules, promotes chemical activity by collision.
- Within the wide spectrum of light, the most useful fraction lies toward the lower (ultraviolet) end.
- Although most photosensitive substances will absorb a wide range of radiation (as far as 2,000 Angstroms apart), there is one optimum wave length. But this is not always the one that can be used because of the absorption and transmission characteristics of other reactants, the neutral or inert carrier and the glass or quartz equipment.

• Even though mercury-arc lamps cover a greater light range than is actually required, they are a superior light source to tungsten or carbon arcs. High-pressure mercury-arc lamps are generally more effective than low-pressure units that emit germicidal radiation that are of little value.

Ultraviolet light, of course, isn't the newest means of imparting extra kinetic energy to a molecule, for radiations from by-products of atomic fission may be able to do the same things. But the photochemical field has been better explored and is off to a running start. Says Illinois Institute of Technology's u-v expert, Harry Gunning, "Its potential is every bit as big as that of the catalysis field at a corresponding period in its growth."

**Making a Move**

For material handling experts last week, the biggest show on earth wasn't the circus. It was the fifth National Material Handling Exposition in Philadelphia's Convention Hall where an estimated 25,000 trooped past the exhibits of 340 firms who displayed equipment price-tagged at \$10 million.

There were fork trucks galore and conveyors aplenty. There were also hand trucks, floor trucks, box cars and pallets. There were even mobile radios and a closed-loop television circuit as engineers from Radio Corporation of America and Clark Equipment teamed up on a demonstration: while the Clark fork trucks were put through their paces—lifting, lowering, moving, loading and unloading—the television cameras ground away and visitors could watch the whole operation on a monitor set in the RCA booth.

**Bigger than Ever:** That the science of "picking things up, moving them around and laying them down" is a big and integral part of American industry, no one will doubt. But just to prove it, the Material Handling Institute (MHI), which sponsors the show, amassed these staggering estimates:

• Between 30 and 35% of production costs are for material handling. As much as 20% of all industrial labor costs is paid to labor involved in such operations. In 1951, industry spent \$9 billion to move materials.

• In some plants, up to 50 tons of material is moved for every ton of finished product.

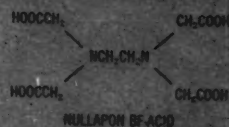
• In 1946, industry bought \$750 millions worth of material handling equipment. By 1952, this figure had grown to \$1,250 million.

It all added up to the biggest show of its kind and, according to MHI, the largest industrial exhibition ever held in Philadelphia as well as the largest held anywhere this year. It was, as one visitor remarked, a "moving exhibition."

**NEW**

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are outstanding sequestering or chelating agents  
capable of controlling, by deionization, undesirable  
di- or tri-valent metal ions in aqueous solution.



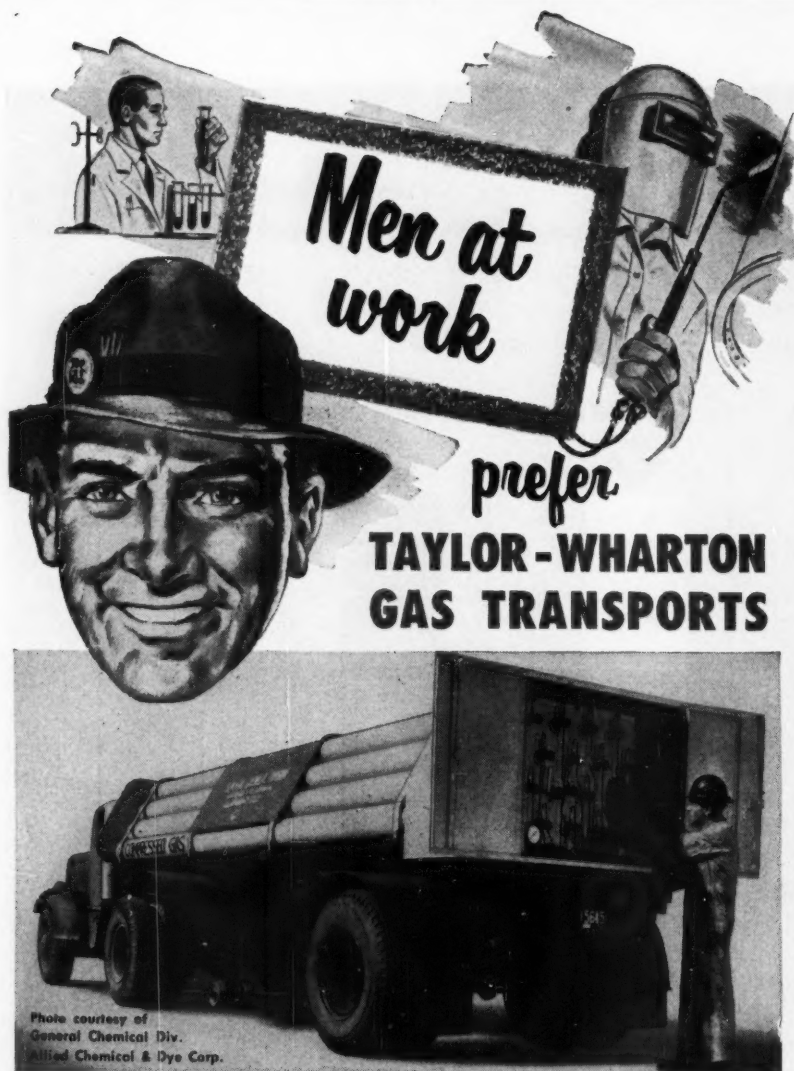
	NULLAPON BF-12	NULLAPON BF-13	NULLAPON BF-78	NULLAPON BF-ACID
	STANDARD LIQUID	CONCENTRATED LIQUID	DUSTLESS FLAKES	TECH. PURE ACID POWDER
Active* Principal	Tetra Sodium Ethylene-diamine Tetraacetate 25-27%	Tetra Sodium Ethylene-diamine Tetraacetate 38-40%	Tetra Sodium Ethylene-diamine Tetraacetate 78-80%	Ethylenediamine Tetraacetic acid (Tech. Pure) 99%
Physical Form Density	Clear Liquid 1.2 (10 # /gal)	Clear Liquid 1.3 (11 # /gal)	Non-hygroscopic Flake .6 (5 # /gal)	Powder .7 (5 # /gal)
Molecular Weight of Active Ing.	380	380	380	292
100 Parts of Nullapon Controls	6.7 parts CaCO <sub>3</sub>	10.0 parts CaCO <sub>3</sub>	20.0 parts CaCO <sub>3</sub>	33.5 parts CaCO <sub>3</sub> when used in alkaline solutions
or ... 1 oz. by weight in ten gallons of water controls	49. PPM CaCO <sub>3</sub>	73 PPM CaCO <sub>3</sub>	146 PPM CaCO <sub>3</sub>	245 PPM CaCO <sub>3</sub> when used in alkaline solutions
STANDARD PACKING	500 lb. Drum 50 lb. Drum 10 lb. Drum	500 lb. Drum 50 lb. Drum 10 lb. Drum	200 lb. Drum 25 lb. Drum 5 lb. Drum	250 lb. Drum 25 lb. Drum 5 lb. Drum

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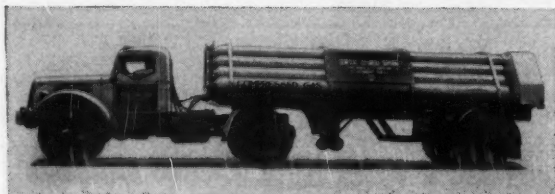
**TAYLOR-WHARTON GAS TRANSPORTS**

Photo courtesy of General Chemical Div. Allied Chemical & Dye Corp.

**Why?—Because there's no rolling, lifting or sliding heavy cylinders when high pressure gases are delivered the Taylor-Wharton way.**

In fact, there's no exchange problem at all. The first to appreciate this are customers, shipping and receiving personnel and drivers. Each T-W Gas Transport replaces 200-400 conventional high pressure cylinders, and can be delivered as a unit to remain right at the user's plant. When exhausted, the transport is returned to producing point for re-load.

Rugged design, careful workmanship plus our vast experience in producing seamless steel gas cylinders combine to make Taylor-Wharton Gas Transports the safest possible. Gross weight is 28,000 lbs., including 30 tubes mounted on single axle with 2-speed landing gear and air brakes. Write for details.



Units now in use carrying:

- Oxygen
- Nitrogen
- Helium
- Boron Trifluoride
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**THE TAYLOR-WHARTON IRON & STEEL CO.**

CINCINNATI 12, OHIO

Also Manufacturers of: Manganese Steel Castings, Alloy and Carbon Steel Castings, Special Trackwork, Gas Cylinders.

## EQUIPMENT . . . .

**Uncommon Holler:** Crouse-Hinds Co. (Syracuse, N.Y.) has gone back to the hand crank on its new spark-proof, flame-tight industrial telephone. (Turning the crank activates a magneto-powered holler that can be heard above the din on the other end.) Aimed for hazardous areas, the phone is solely powered by the sound of the voice, which causes fluctuations in the magnetic circuit of the transmitter. These fluctuations, in turn, set up an electrical current that is said to permit communication with other sound-powered phones in a 30-mile range.

**Cold Control:** In order to eliminate any chances of hot tube failure, Haledy Electronics Co. (New York) has come forth with a new electronic liquid level control using a cold cathode tube. Requiring no filament, the triode uses no warm-up or standby current, has an amplification factor of 2½ million.

**Solids Test:** Hall Laboratories, Inc. (Pittsburgh) recently developed a new test for boiler water solids. Briefly, it involves mixing a water sample with a strongly alkaline anion exchange resin, titrating with acid to the proper endpoint. Declared accurate within 25-50 ppm., the test can be run in approximately three minutes.

**Increased Potential:** Pointing to increased industrial use of redox potentials as the reason, Beckman Instruments, Inc. (South Pasadena, Calif.) is now introducing a new series of large-area platinum, gold, silver or nickel electrodes. The larger sensing area, says Beckman, assures fast response, minimized polarization, easier cleaning and maximum thermal stability.

**Moving News:** The Knudsen Co. (Syracuse, N.Y.) has been licensed to sell and apply Insul-Mastic protective coatings of the Insul-Mastic Corp. of America (Pittsburgh). Knudsen, specialist in insulation engineering, says it will use the coating mostly to vapor-seal insulation.

• The Sturtevant Mill Co. (Boston) has augmented its line of grinding and pulverizing equipment with the purchase of rights to the Micronizer (a jet pulverizer for reducing solids to micron ranges) from Micronizer Co. (Moorestown, N.J.).

• Babcock & Wilcox Co. (New York City) has opened a new office in Miami, Fla., its third in that state.

• Pioneer Pump Div. of Detroit Harvester Co. (Detroit) has appointed three representatives to handle sales and engineering services of its line of Pioneer and Rollway centrifugal and



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### Uniform, High Quality

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ISOBUTYLENE

TRIPROPYLENE

TETRAPROPYLENE

A pioneer and leading manufacturer of Olefins, the Enjay Company and its affiliates have greatly expanded plant facilities to keep pace with increased sales. Chemical manufacturers are finding more uses for Enjay Olefins in the production of derivatives such as alkylated aromatic hydrocarbons, alkylated phenols and cresols, mercaptans, higher alcohols and polymers.

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Methyl Ethyl Ketone  
Ethyl Ether  
Isopropyl Ether  
Dicyclopentadiene  
Naphthenic Acids  
Iso-Octyl Alcohol  
Decyl Alcohol

##### CHEMICAL

PETROHOL 91  
PETROHOL 95  
PETROHOL 99  
Iso-Octyl Alcohol  
Decyl Alcohol  
Tridecyl Alcohol  
Dicyclopentadiene  
Isoprene  
Butadiene  
Ethyl Ether  
Isopropyl Ether  
Tripropylene  
Tetrapropylene  
Aromatic Tars  
Acetone  
Methyl Ethyl Ketone



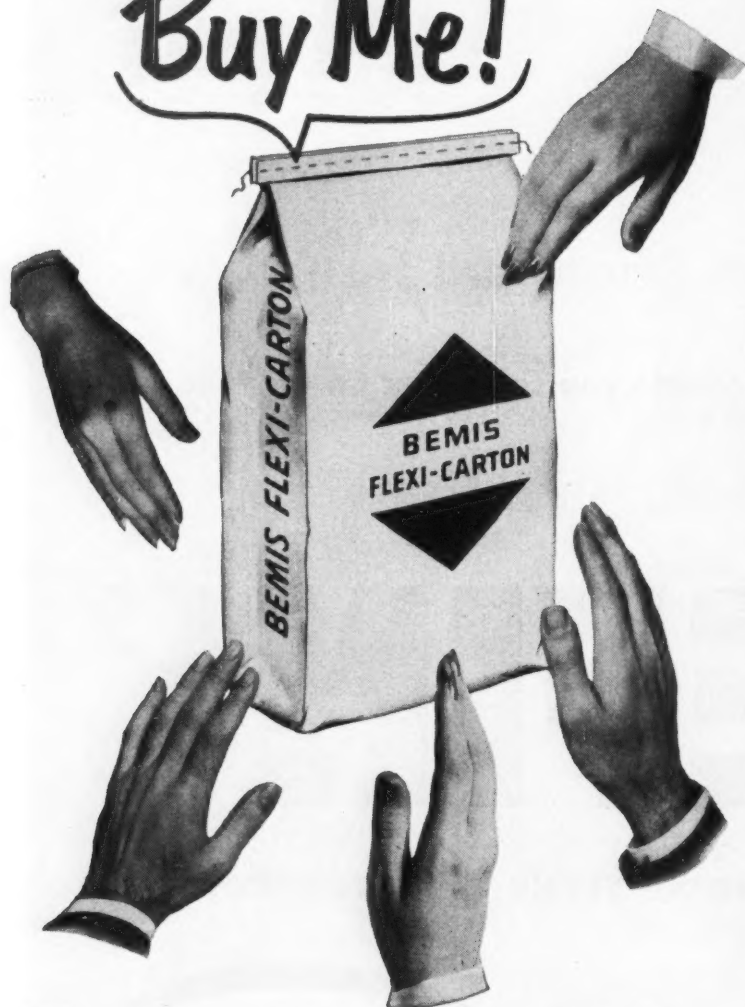
The Enjay Company has long been recognized as a leader in the development and marketing of high-quality products for the oil, surface coating and chemical industries. Backed by greatly expanded plant and distribution facilities, the Enjay Company is supplying a constantly growing list of chemical products to many different industries.

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## PRODUCTION . . .

positive-displacement pumps. The representatives and their districts: Virginia Electric, Inc. (Charleston), West Virginia and adjoining counties of Virginia, Ohio and Kentucky; Shop Supply Co. (Birmingham), Alabama, Georgia and Tennessee; W. H. Erskine Co. (Minneapolis), Minnesota.

• International Resistance Co. (Phila.) has opened a sales office in Syracuse, to function as liaison between the firm and its customers in New York state outside of New York City.

• **Submerged Pump:** Eco Engineering Co. (Newark, N.J.) is now offering a bronze-impeller, positive-displacement pump for handling oils and greases ranging from cottonseed oil to lard in viscosity. Self-priming in low temperatures, the pumps are also said to operate completely submerged and at temperatures to 500 F.

• **Cosmic Counters:** Radiation Counter Laboratories, Inc. (Skokie, Ill.) recently redesigned its cosmic ray counters. Reported improvements: increased area of evacuation tabulation, for better evacuation control; stronger construction at the evacuation point, for longer life; and more intense heating during evacuation, for better out-gassing of counter walls.

• **Silicone Rubber:** Lee Rubber & Tire Corp.'s Republic Rubber Div. (Youngstown, O.) recently entered the silicone rubber fabrication field, is already turning out many molded and extruded products.

• **Canadian Call:** Due to an increasing demand from our northern neighbors, Eutectic Welding Alloys Corp. (Flushing, N.Y.) has formed Eutectic Welding Alloys Co. of Canada, Ltd., to be headquartered in Montreal and Toronto.

• **Preset Pipette:** An automatic pipette graduated in 0.1 cc. is the latest innovation by Standard Scientific Supply Corp. (New York). It is available in two sizes, 2 cc. and 5 cc., is made of hard glass.

• **Refinery Pump:** A new single-suction, single-stage pump is now being made by Allis-Chalmers Manufacturing Co. (Milwaukee). Available in seven sizes with capacities to 1,300 gal./minute, heads up to 600 ft., temperatures up to 800 F, the pump features a water-flushed smothering gland that prevents flammable material from escaping and also cools the shaft and sleeve.

**a new film former—**

# HALF-SECOND BUTYRATE

Eastman announces the production of a low viscosity cellulose acetate butyrate.

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or use of*

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*investigate Eastman  
half-second butyrate*

We will be pleased to send you samples of half-second butyrate and formulation suggestions. Write to EASTMAN CHEMICAL PRODUCTS, INC., Chemicals Division, KINGSPORT, TENNESSEE.

For the first time the protective coating industry can take advantage of the outstanding characteristics of cellulose acetate butyrate in a form that permits its use in formulations requiring a high non-volatile content. The high solubility of half-second butyrate, plus its slow viscosity build-up in economical solvents such as toluene and ethyl alcohol open up entirely new fields to this unique cellulose polymer.

Safely shipped and easily handled as a dry powder, half-second butyrate produces films of low color and high clarity with excellent strength and flexibility at both normal and low temperatures. Extremely stable in the presence of ultraviolet light, half-second butyrate films retain their initially low color, high strength and flexibility for long periods, both indoors and out. No other easily sprayable film former exhibits these characteristics to such a high degree.

In addition half-second butyrate films possess excellent abrasion resistance and are little affected by prolonged underwater immersion or rapid temperature changes.

Whether you are familiar with cellulose acetate butyrate or not, it will pay you to investigate half-second butyrate.

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Where acetylene's usefulness leads — and where it stops — nobody knows.

National Carbide is one of the world's larg-

est producers of calcium carbide and acetylene. Its newest plant at Calvert City, Kentucky, will be capable of turning out approximately 300,000 tons of calcium carbide yearly—the acetylene equivalent of which is around 2,700,000,000 cubic feet. Potential users can be supplied acetylene by pipeline at available adjacent properties. National Carbide also furnishes calcium carbide to chemical producers for generation into acetylene at their individual plants.

We shall be glad to discuss your calcium carbide or acetylene requirements with you.



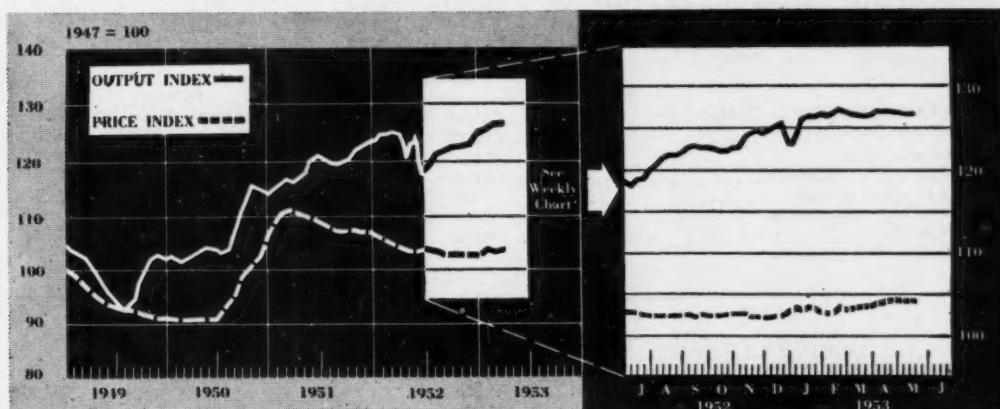
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# MARKETS . . . . .



CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries  
CW Price Index—Basis: Weekly Prices of Sixteen Selected Chemicals

## MARKET LETTER

The dark cloud of economic controls will continue to hover over the nation's economy. The big question, however, is: Will the President or Congress step in to clamp on price and priorities in the event of national emergency?

Last week, the U.S. Senate decided to let Eisenhower call the play, but reserved to Congress the right to name the time. It voted to extend the Defense Production Act for two years, then amended the bill to allow the President to invoke its price, wage and rent powers for 90 days—only in case Congress declares war or acts by concurrent resolution.

The bill also extends for two years—from June 30—modified government powers to allocate scarce materials, but only when the item is needed for defense purposes, and when failure to allocate would result in hardship for civilian users.

House lawmakers, lagging a bit, have just begun hearings on the "freeze" legislation before its Banking and Currency Committee.

Effect of Congressional action on chemical prices, of course, is a thing of the future. Of more immediate concern in the market place is the current report that at least one sulfuric acid maker has taken the plunge, boosted his price about \$2.35/ton.

Talk of higher sulfuric tags has been bruited about the industry for some time now, hence a hike is not unexpected (CW Market Letter, May 16).

Chances are most makers have already decided on new schedules, have just been waiting for a propitious moment to spring them—and this may be it.

Some muriatic acid users, too, may soon be shelling out more for the acid than they are now. One large producer—price-wise near the bottom of the totem pole—will advance his schedules about \$3/ton come June 15.

There has been a split price in the market, because of some earlier price ceiling pressures, but the increase will more than likely establish 20° HCl tags at closer-to-the-outside \$31/ton mark (tanks, works).

## MARKET LETTER

### WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	127.0	126.6	123.4
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.5	104.2	103.3
Bituminous Coal Production (daily average, 1,000 tons)	1,521.0	1,475.0	1,386.0
Stock Price Index of 13 Chemical Companies (Standard & Poor's Corp.)	253.2	151.1	235.9

MONTHLY INDICATORS—Trade (Million Dollars)	MANUFACTURERS' SALES			MANUFACTURERS' INVENTORIES		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	25,428	25,360	22,085	43,771	43,848	43,237
Chemicals and allied products	1,742	1,715	1,515	2,885	2,894	2,998
Paper and allied products	708	722	651	998	992	1,032
Petroleum and coal products	2,063	2,081	1,949	2,642	2,713	2,602
Textile products	1,140	1,113	1,093	2,588	2,618	2,772
Leather and products	283	307	231	551	534	587

The now-familiar refrain, clamped ceiling price vs. upped manufacturing costs, continues as the reason behind the current raft of higher prices.

Three phosphates, di-ammonium, mono-ammonium and tri-calcium, next week join the swelling ranks of more expensive chemicals. The di- and mono-ammonium phosphate crystal tags will read \$8.65/cwt. (bags), \$9.15/cwt. (l.c.l.). Tri-calcium, in carloads or truckloads, will jump to \$7.60 (bags), \$8.40/cwt. in drums.

One company, at least, has set this schedule: prices to become effective June 1 on spot business, July 1 to contract customers.

The same dates for hikes apply to paradichlorobenzene, at least for one maker's product, while another says "effective immediately." The increase is the same however, 2¢/lb. (c.l.), which brings the para price up to about 16½¢.

A companion product, orthodichlorobenzene also moves up 1¢/lb.

Another June date—the third—will see most white phosphorus producers vying for all, or at least part, of the Chemical Corps' recent request for a good-size bit of the material.

If you're interested in further details of the government's invitation for bids opening that day, the number is CML-30-070-53-182. The amount wanted at this particular time is 1,746,073 lb.

Lanolin prices may well slip a little, and behind the possibility are some strictly supply-demand factors. Lanolin schedules were boosted some weeks ago when supply was tight, and although the higher tags put a slight damper on consumer enthusiasm, the increased revenue did enable producers to pay asked-for raw material prices.

Result: an improved supply situation. With more available, however, users are showing less inclination to buy than when the material was harder to get. The ease in demand may have producers chipping a little off current prices.

### SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending May 25, 1953

UP							
	Change	New Price			Change	New Price	
Ammonium phosphate, dibasic, tech., bgs., c.l., works	\$.0015	\$.0865	Paradichlorobenzene, dms., c.l., works		.02	.165	
Calcium phosphate, tribasic precip, NF, bgs., c.l., works	.005	.076	Orthodichlorobenzene, dms., c.l., works		.01	.1225	
DOWN							
	Change	New Price			Change	New Price	
Phenobarbital, USP, dms., 100-lb. lots	\$.50	\$4.00	Cottonseed Oil, Crude tanks, SE		.0025	.1475	
All prices per pound unless quantity is stated.							



## NEW PATTERNS FOR PROFIT



### Could a "Rain-Water Rinse" Ion Exchanger Build More Business for 65,500 Beauty Shops?

Here's a vast new potential market for ion exchange resins . . . and a well-designed commercial appliance to handle them.

Operators of beauty shops have to "merchandise" their services, too. Beauty shops would be highly interested in a gracefully designed, streamlined ion exchanger . . . one that enabled them to **show** customers they were being shampooed and rinsed with "RAIN-WATER RINSE" . . . the softest, purest water science can prepare.

How to do it? Flow tap water through a replaceable cartridge of styrene-type ion exchange resins. And keep shops supplied with packages of ready-to-use replacements.

Based on Monsanto's **STYRENE MONOMER**, styrene cation exchange resins open tremendous possibilities, from processing boiler water to producing crystal-pure liquids for soft drinks or astringent lotions. The purifying resins are stable at high temperatures; they remove metal ions from either acid or alkaline liquids; they have exceptional de-mineralizing capacity. Styrene-type ion exchange resins are the most efficient way to remove small quantities of unwanted minerals from liquids.

For more information on this new pattern for profit, write **MONSANTO CHEMICAL COMPANY**, Texas Division, Texas City, Texas.

Monsanto is a basic supplier of **STYRENE MONOMER**, whose end products can increase your profits in the manufacture of paints, resins, adhesives, floor-covering materials, shoe soles and heels, and appliances. Request a copy of: "Build A Bigger Business With Better Products" . . . on your company letterhead.



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## MARKETS . .



**NONIONIC TOUCH:** Superphosphate is normally hard and dense (above). A touch of dispersant softens it (right)—and opens a 20-million-pound nonionics market.



## Ubiquitous Nonionics

Spearheaded by the "hot-as-a-pistol" superphosphate application, nonionic sales are surging.

Cheaper-materials scramble, sharper molecule tailoring, a new lining for containers mark nonionic milestones.

The nonionic surfactants are a protean breed. Last week, while the Food & Drug Administration was preparing to count one of them (polyoxyethylene monostearate) out for use as bread softener (CW, May 23), elsewhere another was being groomed (for an unrelated use) to enter the chemical market.

Right now, nonionics of all types are moving at a better than 30 million lb./year clip. And a conservative estimate is that they'll hit a 50 million lb. clip within the next two years. If the latest developing "baby"—use in fertilizers—grows the way its proud sponsors hope, this alone could add an easy 20 million lbs. to the market.

It's the superphosphate manufac-

turers (CW, Nov. 22, '52) who are expected to derive the direct benefits from these 20 million lbs. Several large nonionics makers, which have been nurturing this application, claim that the presence of no more than one pound of dispersant per ton of superphosphate during the "wet mixing" of the phosphate rock will (a) reduce handling costs, (b) speed wetting and penetration of the rock, (c) increase the bulk, softness and porosity (usually desirable properties) of the superphosphate.

**For Industry:** The nonionics are growing in some other fields for the same reason they're being promoted in superphosphate; their stability in strong acid gives them exclusive rights

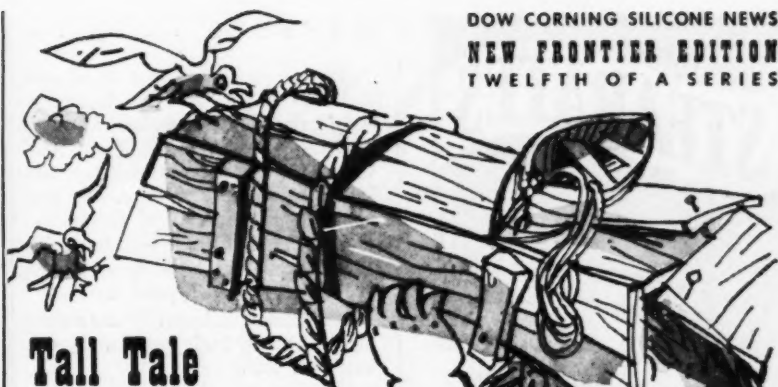


to this type of industrial application.

In the textile industry, for instance, there's more and more wool scouring being done on the acid side; acid vat-dyeing is also on the increase. Non-ionics fit in beautifully here; they work well down into an acid pH value of 2—far beyond the regions where soaps and other detergents can operate.

Metal cleaning is another growing field for nonionics. Within the last few years, platers and other finishers have only begun to really appreciate the importance of preparing surfaces. And recent evidence indicates the possible superiority of nonionics in this vast industrial field. Reason: oily film, always present in metal working, clings more tenaciously to metals than to other materials—glass, for instance. What's important for nonionics: they're top rate oil removers.

**Down on the Farm:** In agricultural chemicals, the nonionics seem to be holding their own, tonnage-wise. Rival anionics makers assert that for sprays the trend is toward their products, because, they claim, nonionics



## Tall Tale

Take Paul Bunyan now, he was born to do big things. Outgrew his first cradle in a week, and his second an' third before they was even finished. Finally put him in a twenty-foot trough his old man built overnight and anchored off Kittery Point. But Paul got restless out there and rocked so hard he made a tidal wave that swamped towns from Bath to Bangor. Hearin' folks talking about what to do with him, Paul wades ashore and disappears into the tall timber, wearing his cradle like a cap.

## to Fabulous Fact

Same's true of silicones. Ever since they were born in a laboratory at Corning Glass Works, silicones have outgrown their kettles and stills faster than Dow Corning could build them. And we've built them fast. Productive capacity was doubled, redoubled and doubled again in the first eight years. We're celebrating our Tenth Anniversary by building new plants faster than ever because engineers have learned that silicones make the impossible practical.

They're among the Fabulous Facts of our times . . . facts that match the tall tales retold in these columns and assembled now in a useful *new SILICONE booklet entitled*

### Tall Tales

### and Fabulous Facts

Like the tall tales our ancestors told to make the dark forests and endless plains seem less overwhelming, silicones happily resolve complex problems in design, production and maintenance.



Dow Corning Corporation • Department BR-5A • Midland, Michigan

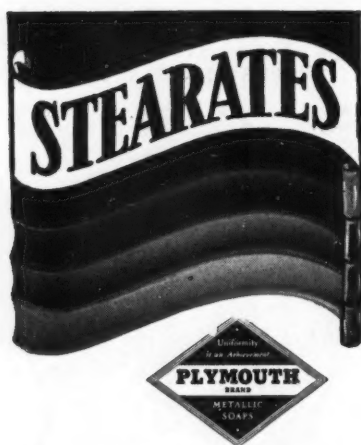
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## MARKETS . . . . .

don't give such good flash dispersion, cost too much. Present dispersants admittedly do not contain as much nonionics as formerly (about 33% vs 100%), but the entire spray market is growing so rapidly, the total nonionics usage has held steady.

**In the Home:** In the washing habits of Americans, these agents are playing ever-larger roles. Typical trends:

- Commercial laundries are switching over to dry built soaps; many contain nonionics.

- Self-service laundries, blossoming over the whole land and now firmly rooted, are big users of non-ionic-containing cleaners.

- At home, those two devices associated with "modern living," the automatic dishwasher and washing machine, are big potential nonionics takers. "Suds" or foam, so dear to the average housewife, become a source of mechanical trouble in these devices; low-foaming nonionics ease the problem. In this connection, detergent makers, at the request of the Automatic Washing Machine Manufacturers, are working out controlled sudsing formulations that will minimize bearing trouble in the machines. Significance for nonionics: they're often chosen because their foaming qualities can be tailored to any desired degree.

**Many Called:** Under the general term "nonionic," a multitude of chemicals can be included; lumping them together into a simple classification is not easy.

For example, although right now the bulk of them are straight alkyl aryl polyoxyethylene ethers, some sulfated derivatives are being offered. Other offshoots, combinations of polyoxyethylene with polyoxypropylene, are coming into the picture.

In the same manner, other raw materials, such as fatty acids, fatty alcohols and mercaptans, are being combined with varying amounts of ethylene oxide to form a ramifying variety of end products. Even low-price tall oil is being tried with some success.

Diverging further, into an entirely different base, is another general type, the alkanol amides; these again are available in a variety of compounds.

**How Cheap?** One cause for today's host of nonionics is the scramble to reduce costs. Manufacturers, certain that their present offerings will find ready markets, anticipate the day when fellow nonionics makers will give price competition.

Manufacturing costs are already about as low as they can be brought,

so principal cost reduction efforts are being directed toward finding other cheaper raw materials.

However, few producers anticipate cutting prices to the anionics level. "They're too low now," is a typical reaction.

Furthermore, the makers rationalize that they don't need to compete with the large volume, low cost (and low profit) anionics. They consider the nonionics as a class of special chemicals, well able to stand upon their own characteristic qualities.

**Common Grounds:** Although stemming in some cases from different chemical families, nonionics do have some common characteristics.

- Mostly, they're concentrated liquids. Until a few months ago, this quality posed a troublesome transportation problem. Handling in cans and drums had been out of the question; the 90-100% concentrated surfactants were simply too corrosive for ordinary linings. But recently (CW, Nov. 1, '52) they got a helping hand from the resin industry. Thanks to the development of a new resin coating, shipping in metal containers is now feasible. Result: in addition to handling more easily, they now enjoy, because of their concentrated form, a considerable freight advantage over present dry anionics having only 35-40% active content.

(Incidentally, at least two products now skirt the transportation problem; they're being produced in powder form.)

- Stability is another common ground of the nonionics. They will do a job under conditions in which other agents break down. Besides working in acid solution, they perform well over a wide range of temperature, in the presence of oxidizing or reducing agents, and in high salt concentrations.

Most of them are highly flexible:

- Because the number of oxyethylene groups (in the principal type) of a nonionic can be adjusted to a fine degree, the final product can be tailored to suit the use.

Thus, nonionics run a gamut from an especially water-soluble type for such use as in automatic washers, to essentially oil-soluble, now employed "in tremendous quantity" as an additive to Stoddard solvent in dry cleaning.

**Naturally Compatible:** Nonionics seem to "get along" with almost everything. And this quality, as valuable in chemicals as in people, is opening market doors wherever they can assist other chemicals to perform their more specific functions.

## MARKETS . . . . .

For example, because they will not neutralize the germicidal values of the cationic quaternary salts, nonionics can be used in germicide formulas to enhance penetration.

Another instance where nonionic compatibility pays off: general household cleaners. Both the nonionics makers and big soap and detergent compounders are now busily developing mixtures that will offer advantages of both anionics and nonionics, plus "good old" soap.

Because of their high compatibility, nonionics assist the other ingredients to operate even in hard water. Also, although not particularly good "foamers" themselves, they stabilize the foam whipped up from their fellow cleaners.

One leading manufacturer opines that because nonionics are effective in salt solutions, they possess a huge potential as sea water detergents.

**All Directions:** Taken as a class, the nonionics come as close as any materials to emulating the famous rider who rode off in all directions.

New applications for these compounds as detergents, emulsifiers, dispersants, and generally as surface active agents pop up in some of the most peculiar quarters.

Leather processors, with their acid, alkali and salt baths, are taking to nonionics. Paper and textile finishes are using waxes and resins emulsified with them.

Rubber fabricators, too, are now trying them for dispersing pigments, stabilizing latices, reducing latex surface tension. Mine and foundry operators are finding them helpful in wetting down dusts, inhibiting corrosion.

As a result of these diverse possibilities, at least one director of market development is finding that the best way to cover the whole field is to literally sample a complete cross-section of industries, regardless of any preconceptions he may have concerning potentials.

Even keeping a watchful eye and open mind for industrial applications isn't enough. An alert development man must never overlook new household uses. Otherwise he might have missed the nonionic-consuming rug cleaner that sprouted suddenly last year.

For although industry may produce the variety of applications, development men are of the opinion that nonionic volume will continue to come from home users. Present ratio of household/industrial tonnage stands at about three to one. Many believe the proportions will stay that way.

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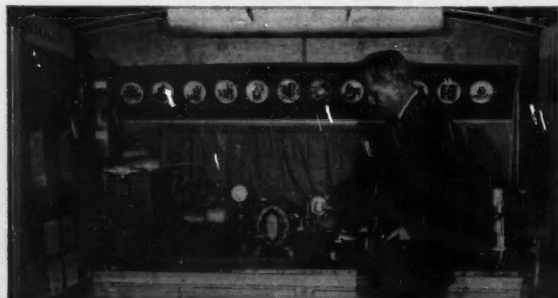
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Scheduled to tour the United States, this "Mobile Lacquer Information Center" probably will visit your locality. If you are concerned with the manufacture or application of protective coatings, and would like a group to see this exhibit, get in touch with the Hercules office nearest you.



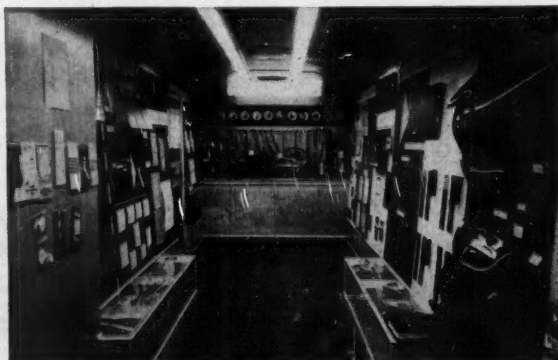
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# SPECIALTIES . . .



STROBANE SPONSORS: \* A new insecticide bows in at CSMA meeting.

## Coming Their Way

Sales up, supplies good, and business coming their way cheers specialties makers at 39th midyear conclave of CSMA.

Product news is introduction of insecticide Strobane, B. F. Goodrich Chemical Corp.'s chlorinated terpene.

Satisfaction seemed to predominate at the 39th midyear meeting of the Chemical Specialties Manufacturer's Assn. in Chicago's Drake hotel. And a couple of indications of what buoyed the spirits of the specialties makers are found in the just-completed surveys by a pair of CSMA divisions:

- The Insecticide section's first tabulation of sales of its bug killers indicated that more than 13 million gal. of liquid insecticides, and at least 20 million lbs. of insecticide powders were produced in 1952. This initial survey, which included data for 1951, indicated a 15% growth over the preceding year.

- The Aerosol division's scorecard (its second) revealed that well over 96 million units—valued at \$105-110 million—were made in '52. The new mark is more than double the record established in last year's survey.

These industry studies have just recently become part of CSMA's activities—and they seem to be heartily welcomed by the concerned firms. Return of the survey questionnaires has been excellent; the aerosolers got

\* L. to R. Dan Kent, Goodrich Chemical Co.; Herman Shelanski, Industrial Toxicological Labs.; Friar Thompson, consultant.

back about 60% the first year, and better than 90% this time. The insecticide group based its first figures on replies from about 38% of those contacted.

**Bad News for Bugs:** B. F. Goodrich Chemical Co. chose the meeting to take the wraps off its new insecticide, Strobane.

The new compound is "a terpene hydrocarbon with a chlorine content about 66%." A liquid, soluble in most solvents, it has shown good kill characteristics against a range of insects, and appears to be effective against pests that have developed resistance to some other insecticides.

Other pluses Goodrich is talking about:

- Low toxicity toward animals, which makes Strobane look good for household aerosol sprays—and that will be the first target for Goodrich. In units like this, the toxicant is combined with a knockdown agent such as pyrethrum.

- It leaves no white residue when deposited by solvents on clothing.

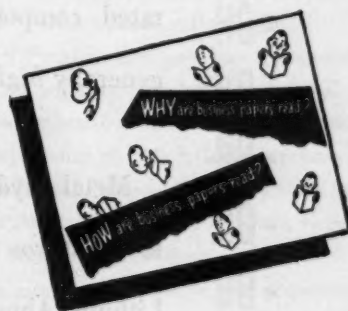
- It is simply produced in nearly all readily used forms—emulsifiable concentrates, dusts, etc.

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## SPECIALTIES . . . .

Right now Strobane is in semivol-  
 ume production at Avon Lake, O.,  
 and is available to those desiring to  
 test it. Goodrich has not as yet applied  
 for permission to sell it—but when that  
 time comes (and it will be within  
 months) it is expected to be com-  
 petitively priced.

**Formulation Shift:** Strobane was  
 not the only insecticide to make  
 news—the survey revealed a trend  
 away from DDT-based residual sprays  
 (volume dropped 6%), and toward  
 chlordane formulations (percentage of  
 chlordane-based products climbed  
 5%).

The meeting this year was less con-  
 cerned with new products than it has  
 been in the past; many of the sections  
 devoted most of their time to pro-  
 duction discussions, formulation pan-  
 els, and marketing studies. There were  
 close to 700 at the meeting in the  
 Drake, and as usual, the Monday  
 night open house was a top feature  
 of the gathering.

Next meeting, the 40th, is set for  
 Dec. 6-8 at the Mayflower hotel in  
 Washington.

## Stocking Stretchers

With a calculating glance at the legs  
 of American women, specialties mak-  
 ers have come up with a nylon hose  
 washing liquid claimed to boost the  
 mileage of stockings. Already a hand-  
 ful of products are on the market—  
 and more are on the way.

Essentially mixtures of detergents, fila-  
 ment-coating resins, and perfumes,  
 they are the most successful of several  
 attempts to capitalize on the big sales  
 of nylon hose.

Newest of these washing com-  
 pounds emphasize "vital ingredients  
 by Du Pont," an ad phrase not par-  
 ticularly relished by that firm, but  
 one it can apparently do little about.

For many of the compounds are  
 based on a hosiery finish Du Pont has  
 sold to the trade for the past eight  
 years—Methacrol NH, a thermoplastic  
 methyl methacrylate resin. A "sub-  
 stantive," it is applied to the hosiery  
 at the mills by dipping or tumbling  
 after the hose has been steam-shaped.

The methyl methacrylate film that  
 is coated on the filaments has been  
 shown to reduce snagging of hose—but  
 Du Pont doesn't make any claims for  
 "strengthening," "improving the lus-  
 ter," or "clarifying the stitch" of hose.

Formulations as retailed are prob-  
 ably composed of about 30% of the  
 Methacrol NH (in addition to Du  
 Pont, American Polymer Corp., Pea-  
 body, Mass., offers a methyl metha-  
 crylate hosiery finish) with roughly

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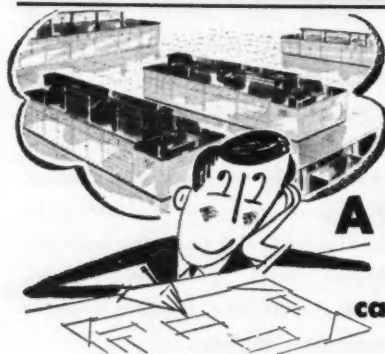
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Ny-Rite is another, sold by Senator Dudley Le Blanc of Hadacol fame, which is distributed in the South. Sage Laboratories (New York) plans soon to introduce one called Nu Life through its chain store outlets.

The Methacrol-based products are far from alone in the field, however. One of the oldest (introduced in 1939) is Nylon Dip, made by Robert Smith Mfg. Co., Inc. (Los Angeles) of a "secret" ingredient called Avasol. It is a powder, rather than a liquid.

Another entry is Plastette, a polyvinyl acetate emulsion used as a rinse additive, and made by G M Liquid Plastics, Ltd. (Oklahoma City and Montreal). In addition, there have been powders and aerosol products said to up the durability of nylon hose.

None of the interested firms will hint about market possibilities. Their products range in price from 39¢ up to \$1 for a package that will do about 35 pairs of stockings. The more than 56 million pairs of hose produced last year hint at pretty good potentialities.

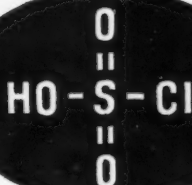
**Glass Hulls:** A new plastic resin, TT-KS, permits glass fabric-plastic application to boat hulls, as well as to deck and cabin areas. Glass Plastic Supply Co. (Linden, N.J.) is selling the new Boat Armour kit, available in a variety of colors. A trial kit, covering 12 sq. ft., is offered for \$5; average coverage with one layer is estimated at 40¢/sq. ft.

**More than Nicotine:** Need for corrective action in the use of insecticides by South Carolina tobacco growers and other producers of flue-cured tobacco was brought out recently at a meeting of Carolina warehousemen. Trouble has arisen from insecticide residues remaining on the leaves after curing. In addition, the Production and Marketing Administration, U.S. Dept. of Agriculture, has indicated that flue-cured tobacco with undesirable residues would not be eligible for price support loans.

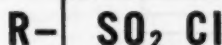
**Maine Plant:** Northeastern Chemical Corp. has just opened a new technical process plant for herbicides and fungi-

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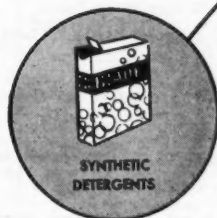
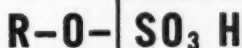
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Dryer, 502-20 Roto-Louvre. Heat & Power Co., Inc., 70 Pine St., N.Y. 5. Hanover 2-4890.

Filters, all sizes and types. Perry Equipment, 1415 N. 6th St., Phila. 22, Pa.

Mikro-Pulverizers—#1-SH, #1-SI, #2-DH, #2-TH, #2-SI. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Mixers; W. & P. to 300 gal. Jktd. First Mach. Corp., 157 Hudson St., N.Y. 13.

Reactors Stainless to 500 gal. First Mach. Corp., 157 Hudson St., N.Y. 13.

Reactor, 2000 gal., acid glass, ASME U69. Heat & Power Co., Inc., 70 Pine St., N.Y. 5.

Reactor, 3000 gal. SS Clad, 15# Int., jacket 50#., ASME code. Heat & Power Co., Inc., 70 Pine St., N.Y. 5. Hanover 2-4890.

Tanks, Alum. #61-S-T. 330 Gal.—150#WP and 480 gal.—80#WP. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Tanks, Steel, Processing, 15,000 gal. vertical, 80 lbs. int. pr.; Turbo Agitator 40 HP, coils. Perry Equipment, 1415 N. 6th St., Phila. 22, Pa.

Tanks, S/S, from 9 gal. to 5700 gal. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Tanks—S-S 5' x 8'; 12' x 24'. Wellworth Trading Co., S. Wabash Ave., Dept. CW-1, Chicago 16, Illinois.

### Wanted

#### WANTED

#### MACHINERY OR PLANT INCLUDING

Vacuum Dryers  
 Filter Presses  
 Heavy Duty Mixers  
 Rotary Filters  
 Reaction Kettles  
 Columns  
 Pulverizers  
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 P. O. Box 1351, Church St. Sta., N. Y. 8, N. Y.

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Chemical Equipment for Defense Plant Work  
 Autoclaves  
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 Dryers  
 Filters  
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 Mixers  
 Presses  
 Pulverizers  
 Tanks  
 Interested in complete plants—either now operating or idle. Give full particulars when writing.  
 W3117 Chemical Week  
 330 W. 42nd St., N.Y. 36, N. Y.



## rocess industries

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DRUGS—RESINS—WAXES  
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Worth 4-5120

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READY TO BUY  
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HANover 2-5970

### BUSINESS OPPORTUNITIES

#### PLANT FOR SALE

Metropolitan Area. 65,000 sq. ft. Three story  
brick building. 3 oil-fired boilers over 700 B.H.P.  
each 160 lb. rating. Building sprinklered thruout  
with freight elevators, 185' loading dock, and  
6,000 sq. ft. yard. Unlimited soft water and city  
sewage. Brick garage 10,030 sq. ft. sprinklered  
and heated. Easily accessible to various com-  
munities, highways and turnpike. Plant now op-  
erating with plentiful local labor.

BO 7882 Chemical Week  
330 W. 42 St., New York 36, N. Y.

Australian Manufacturer interested in contact-  
ing American Group specializing in production of  
polyester resins, view to co-operation and manu-  
facture in Australia. BO-7949, Chemical Week.

## SPECIALTIES

cides in Westbrook, Me. Claimed to be the first of its sort in the area, the new plant is said to cut 48 hours off the running time between source of supply and farmers of the area. In addition to making pesticides, North-eastern will produce Monsanto-licensed soil conditioners.

**Mite Killer:** Insecticide Div., Geigy Co., Inc., has now gone commercial with its potent miticide, Chlorobenzilate, tested under the tag 338 for the past two years (CW, Apr. 5, '52). The new product has demonstrated value in control of mites on ornamental plants, as well as crops, has shown effectiveness against acarides resistant to other miticides. It's available as a 25% emulsion concentrate, 25% wettable powder, 3% dust, and in the technical form.

**Water Off:** American Polymer Corp. (Peabody, Mass.) is introducing Polyco 505, a new water-resistant polyvinyl acetate emulsion for adhesives and paints.

**Protection Special:** Lockwood Resins Co. has been organized in Pasadena, Calif., for manufacture of protective coatings, plastics, and the like. Key product at present is plastic-base coating for plywood construction forms.

**Orford Reopens:** Orford Soap Co.

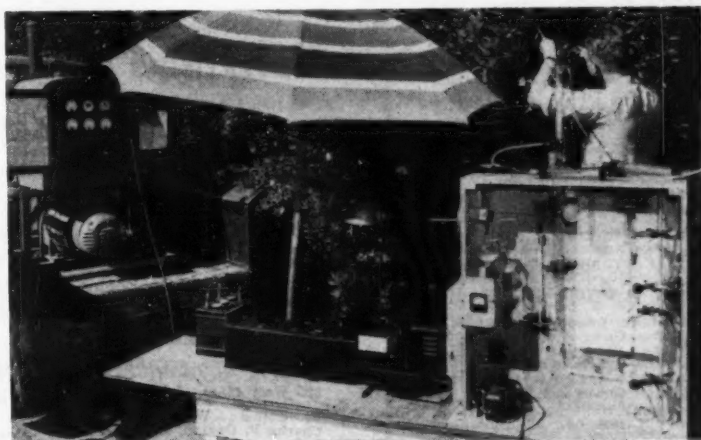
(Manchester, Conn.) has reopened, after having completed experiments in manufacturing procedure and inventorying. Plant closed Jan. 19.

**Two-in-One:** A new approach to control of spider mites is the lindane-Aramite mixture just developed by Doggett-Pfeil Co. (Springfield, N.J.). D&P Lindane-Aramite Emulsion, as it is tagged, is used at a rate of two tablespoons per gallon of water; 8-oz. bottle will sell for \$1.75. Distribution is national.

**Treat for Sewage:** Market Coverage, Inc. (Seattle, Wash.), will build a \$370,000 plant near Everett, Wash., for manufacture of sewage treatment chemicals. Plant slated for completion June 1.

**Number Eleven:** H. B. Fuller Co. has just opened a new adhesives plant in Portland, Ore. The Portland factory, eleventh unit in the Fuller chain, will operate under the H. B. Fuller Co. of Calif., will produce pastes, glues, resins, and other industrial adhesives.

**Caulker:** A new oil-base paint for waterproofing masonry surfaces is being introduced by the Monroe Co., Inc. (Cleveland). Tabbed Damp-Seal, it consists of a grit-like volcanic ash filler in an organic carrier; particles fill pores of the building block. It is



### Spectrophotometer on the Vapor Trail

ANALYZING ORCHARD air for parathion vapor is the job of this quartz spectrophotometer. Running eight hours daily, during two separate three-month periods at a Riverside, Calif., citrus grove, the analyzer demonstrated that there is no dangerous vapor given off

after parathion spraying. The self-powered unit draws air through a filter into an alcohol solution, which extracts the parathion vapor. A six-month test period showed a maximum of 0.05 milligram of vapor per cubic meter of air—far too little to cause harm.

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BUSINESS MGR. .... A. J. Mangold
Atlanta 3 .... Robert H. Sidur, 1821 Rhodes-Haverty Bldg., Walnut 6778-2353
Chicago 11 .... Alfred D. Becker, Jr., Steven J. Shaw, 620 N. Michigan Ave., Mohawk 4-5300
Cleveland 15 .... Vaughan K. Disette, 1510 Hanna Bldg., Superior 7000
Dallas 1 .... James Cash, First National Bank Bldg., Prospect 7-5044
Los Angeles 17 .... Jon. H. Allen, 1111 Wilshire Blvd., Madison 6-4823
New York 36 .... Knox Armstrong, Robert S. Muller, L. Charles Todaro, 330 West 42 St., Longacre 4-3000
Philadelphia 3 .... William B. Hannum, Jr., Charles F. Onasch, Architects Bldg., 17th & Sansom Sts., Rittenhouse 6-0670
San Francisco 4 .... Ralph E. Dorland, 63 Post St., Douglas 2-4600
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St. Louis 8 .... 3615 Olive St., Continental Bldg., Lucas 4367

## SPECIALTIES . . . .

sold ready-mixed, is said to resist fading and chalking-off.

Glidden Branch: Glidden Co. (Cleveland) is establishing a \$100,000 branch office and warehouse in Nashville, Tenn., due in service by this fall.

## Foiled Bleach

An old product in a new dress—"javel" powder in plastic-lined foil—is an eye-catching seller of Ja-Po Products Co., Ltd. (Montreal, Can.).

Many's the time bleach powder has been offered in dry form. But almost always, air got into the package, resulted in a powder with little or no strength by the time the housewife was ready for it. Now, Ja-Po has come up with an air-tight package (retailing at 5¢) that holds just enough bleach to do the average wash.

Pitch to the housewife: the powder is more convenient, easier to use than



ONE FOR THE WASH: For one-shot sales, individually packed javel powder.

the bottled product—no fumes, no stopper, no bottle.

And for the retailer, Ja-Po touts other advantages: an attractive, three-color display, occupying only 45 sq. in. and holding four dozen envelopes, to promote impulse buying. And there's 17¢ profit on every dozen packs.

The handling savings are good all around. Ja-Po packs 24 dozen envelopes in a 16x16x4-in. shipping container—the equivalent of two gross of bulky bottles. Currently Ja-Po is turning out its javel powder packets at a 90-per-minute clip—and Ja-Po hopes to be selling in the U.S. before long.

Chemical Week • May 30, 1953



## New Plastic Bodies Make Possible Sports Cars for the Average Family

The drawing-board dream of a compact, sports-type family car . . . easy to handle in traffic, economical to buy, operate and maintain . . . may soon come true.

For polyester resin reinforced with glass fiber now permits the construction of *one piece* auto bodies, which greatly reduce sports car assembly costs. The light weight and great strength of such bodies also cut sports car operating and maintenance costs.

RCI, the world's leading producer of synthetic resins, furnishes polyester resins to many industries. RCI makes its polyester resins with full quality control, since it supplies itself with their basic raw materials, phthalic anhydride and maleic anhydride.

Reichhold also manufactures phenol, formaldehyde, glycerine, sodium sulfate and sodium sulfite.

**REICHOLD CHEMICALS, INC.**  
630 Fifth Avenue, New York 20, N. Y.

*Creative Chemistry . . . Your Partner in Progress*

# REICHOLD

## Uses of RCI Products

**CANVAS, PAPER AND GLASS CLOTH LAMINATES:** PLYOPHEN cresol, phenolic and resorcinol-formaldehyde resins and varnishes; POLYLITE polyester resins.

**CARBON PAPER:** RCI inorganic chemical pigment colors.

**CASTINGS:** FOUNDRIZ powdered phenolic resins (for the shell molding process); FOUNDRIZ liquid phenolic resins and FOUNDRIZ core oils (for core binders).

**FURNITURE, PLYWOOD, FLOORING, HARDBOARD AND CHIPBOARD:** HYDROPHEN phenolic glues; PLYACIEN protein glues; PLYAMINE urea-formaldehyde glues; PLYOPHEN phenolic and resorcinol-formaldehyde glues.

**LEATHER:** BECKOSOL alkyd resins (for leather finishes); PLYOPHEN resorcinol-formaldehyde resins, SUPER-BECKACITE pure phenolic resins, SYNTH-COPAL ester gums (for leather adhesives).

**LINOLEUM:** BECKOSOL alkyd resins and PENTACITE pentaerythritol resins (for linoleum coatings); RCI inorganic chemical pigment colors.

**PAINTS, VARNISHES AND LACQUERS:** BECKACITE (1) fumaric, (2) maleic and (3) modified phenolic resins; BECKAMINE urea-formaldehyde resins; BECKOLIN synthetic oils; BECKOPOL modified phenolic resins; BECKOSOL (1) phenolated, (2) phthalic-free, (3) rosin modified, (4) pure drying and (5) pure non-drying alkyd resins; KOPOI processed Congo copals; PENTACITE pentaerythritol resins; STY-RESOL styrenated alkyd resins; SUPER-BECKACITE pure phenolic resins; SYNTH-COPAL ester gums; WALLKYD pure drying alkyd resins (for alkyd flat wall vehicles); WALLPOL vinyl-type copolymer latex emulsion (for latex flat wall coatings); RCI inorganic chemical pigment colors.

**PAPER:** BECKAMINE urea-formaldehyde resins (for adding wet strength, improving the wet rub of starch-clay coatings, and waterproofing starch adhesives); RCI inorganic chemical pigment colors (for paper coloring); STY-RESOL styrenated alkyd resins (for paper coating).

**PRINTING INKS:** BECKACITE fumaric, maleic and modified phenolic resins; BECKOLIN synthetic oils; BECKOPOL modified phenolic resins; RCI inorganic chemical pigment colors.

**TYPEWRITER RIBBONS:** RCI inorganic chemical pigment colors.

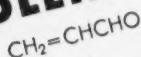
**WAXES AND POLISHES:** BECKACITE modified maleic resins; SUPER-BECKACITE pure phenolic resins; SYNTH-COPAL ester gums.





*Now available to industry!*

## ACROLEIN



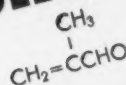
### FOR:

**Pharmaceuticals**—methionine, 2-amino-pyrimidine, folic acid, and substituted quinolines.

**Odorants**—by Diels-Alder condensations.

**Coating Resins**—reaction with urea, thiourea, and polyhydric compounds.

## METHACROLEIN



### FOR:

**Copolymers**—with acrylonitrile, acrylic esters, and styrene—they have high softening points and good solvent resistance.

**Resins**—for impregnated fabrics, linoleum, and adhesives.

56.06	.....Molecular Weight	.....70.09
0.8427	.....Specific Gravity at 20/20°C.	.....0.8474
52.6°C.	.....Boiling Point at 760 mm. Hg.	.....68.0°C.
215 mm.	.....Vapor Pressure at 20°C.	.....120 mm.
<0°F.	.....Flash Point (Cleveland open cup).	.....5°F.
20.8% by wt.	.....Solubility in Water at 20°C.	.....5.9% by wt.
6.8% by wt.	.....Solubility of Water in at 20°C.	.....1.7% by wt.

**ACROLEIN and METHACROLEIN** are highly reactive intermediates. They undergo reactions characteristic of both unsaturated compounds and aldehydes.

The conjugation that exists between the double bond and the unsaturation of the carbonyl group increases the reactivity of both groups. These groups can be made to react either simultaneously or individually—the ethylenic groups with halogens, halogen acids, 1,3 dienes, alcohols, and mercaptans—the aldehyde groups with anhydrides and dibasic organic acids, Grignard reagents, alcohols, and HCN. Acrolein and methacrolein are shipped containing 0.1 per cent hydroquinone to inhibit polymerization.

For further information on either of these materials call or write the nearest Carbide and Carbon Chemicals office *today*. Ask for the technical bulletins "Acrolein" (F-7389) and "Methacrolein" (F-7620). These bulletins will provide you with additional data on the physical and chemical properties of acrolein and methacrolein. They will also serve as a permanent reference for your work.

